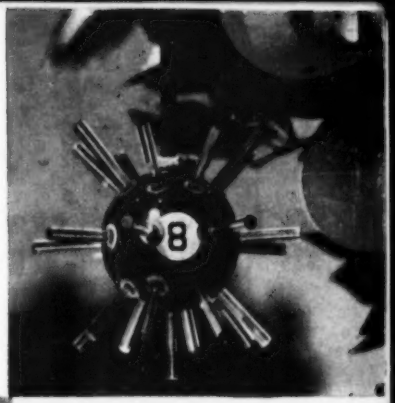
POPULAR SCIENCE

MONTHLY

MECHANICS - AUTOS - HOMEBUILDING



35¢ April

8-Ball Tests New Bug Killers

PAGE 114

Nash's New Economy Car

Ford's New Sports Car

PAGE 100

GIVE YOUR HOUSE THAT DREAM HOME LOOK

.. from Cellar Right Up to Attic!

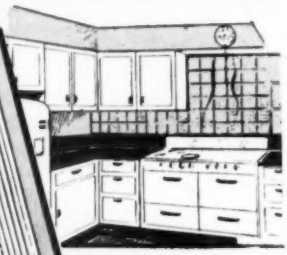
For Free Trial of this DeLuxe THUMB-NOTCHED Edition at only $1 extra, check DeLuxe box in coupon.

FREE! 7 Days Trial

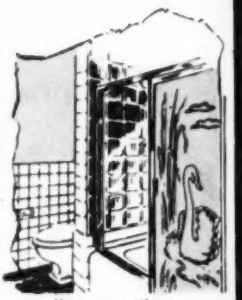
"WISE book"

Amateur Builder's HANDBOOK

Hubbard Cobb



You'll be the hero of the hour when you build this Streamlined Kitchen every woman dreams about, with the help of this book!



You can easily grace your home with a modern, stunning Hollywood Bath!

MORE THAN 1,000 "How-to-Do-It" Pictures!
(Charts, Tables, Sketches, etc.)
300,000 Words, 512 Pages of Room-by-Room Ideas
by Famous "Handyman" Hubbard Cobb

Ideas on using glass blocks to give rooms glamor, better lighting!

9 Almost Like Having Books in ONE!

1. Concrete, Masonry, Bricks, Glass
2. Rough Carpentry, Houses, Rooms
3. Millwork, Windows, Doors, Screens, Floors
4. Roofs, Insulation, Ventilation, Heating
5. Interior Finish, Plaster, Linoleum, Tile, Flooring
6. Plumbing, Heating, Fireplaces, Chimneys
7. Tools, Hardware for Your EVERY Need
8. Paints, Varnishes, Sprayers, Brushes
9. Electrical Wiring, Fixtures

and Many Other Features!

Here Is a Mere Glimpse of Immense List of Contents:

1001 Money-Saving Ideas on EVERY Phase of Home Improvement
Show How YOU Can Have the Luxury Home You've Longed for!

CONCRETE MASONRY, GLASS, BRICKS
Shower Stall
Water-proofing
Correcting Sagging Wall
Glass Block Doorways, Walls
Concrete-Pouring Methods, Tools
Wood Frames

Cap Flashing, shown here, is one of hundreds of roofing features!

Brick Veneer
Arches, Doorways, Partitions
Patterns in Bricklaying
Concrete Masonry Walls
Brick Facing
Concrete Steps

CARPENTRY
Lumber—Standard Measurements
Lumber Defects—How to Recognize
Roof, Nailing
Wall Bracing
Partitions, Wood
Plywoods, Fences
Stairs, Outdoor, Cellar
Kitchens—Plans and Designs
Woods for Exterior Trim
Woods for Porches
Woods for Interior Trim
Woods for Siding
Rafters, Layout Terms
Repairing Interior Walls
Terrace, Porch Construction

"How-To" sketches show you EVERY type of joist you'll ever need!

MILLWORK, WINDOWS, DOORS, SCREENS, FLOORS
Floors—Nailing, Laying, Finishing
Edgings, Doorways
Storm Windows, Doors
Shelves, Cabinets
Adjusting Doors
Built-In Furniture
Bathroom Cabinets
Closets, Working Bins
Joining Roof to Walls

ROOFS, INSULATION, VENTILATION, FLASHING
Installing
Flashing—Diagrams, Instructions, Valleys, Chimneys, Hips, Windows, Doorways, etc.
Types of Insulation
Insulating Farm Buildings
Types of Shingles, Walls, Roofs, Hips, Ridges, etc.
How-To, How-Not-To Ideas
Tips on Repairing, Replacing
Leaks in Old Roofs
Roofing, Instructions

PLASTER, LINOLEUM, TILE
Tileboards
Repairing Walls
Tile-Laying Tips
Wall Plaster Mixing
Exterior and Interior Walls
Door, Window Openings, Trims
Wall Board Installation

You get countless wiring facts such as installing outlets, even in concrete!

Linoleum Laying
Lifetime Wall Coverings
Repairing Ceilings
Installing New Ceilings
Making Rooms Seem Larger, Wider
Installing Ceiling Panels

HEATING, PLUMBING, CHIMNEYS
Building Fireplaces
Plumbing, Pipes of All Kinds
Faucet Installations
Coal Bins, Construction
Fixtures, Tubs, Sinks, Showers
Saving on Fuels
Duplex Bathrooms
Chimney Construction
Hot Water Systems
Making Woods Fire-Resistant

PAINTS, VARNISHES
Tinting
Cleaning Paint Spots
Floor Sealers
Decorating Old Floors
Color, Decorating Tips
Types of Finish—When, Where, How to Use
Whitewashing Ingredients
Painting Wood Floors
Paints for Brick, Concrete, Plaster

TOOLS, NAILS, HARDWARE
Scaffolds
Ladders, Use and Precautions
Sliding Windows
Latches
Screens—Repairing, Replacing, Construction, Painting, Installation
Bolts, Screws, Nails—All types and Sizes

ELECTRICITY
Switches
Individual Room Heating
Thermostats
Kitchen Outlets
Bells, Chimes
Lamps, Types, Best Placing
Low-Voltage Wiring
Approved Labels

ALL types of closets — for kitchens, bathrooms, bedrooms, etc.

PLUS ALL THESE EXCITING EXTRAS
Construction of Driveways
Repairing Garden Hose
Awnings
Landscaping
Lawn-Roller, How to Make
Moving of Heavy Items, Furniture
AND MUCH MORE!

Amazing ALL-NEW 9-Books-in-1 Helps You SAVE Thousands of Dollars—Increase Your Home's Value!

1001 Ideas for Streamlining Kitchens • Built-in Closets • Extra Bathrooms • Heating Systems Converting Attics & Cellars • Modernizing EVERY Room!

PICTURIZED Step-by-Step Instructions Show You How!

DON'T put off those vital home repairs and improvements another day! Whether you want a sunny Streamlined Kitchen, a cozy livable Attic Study or Playroom, a new Driveway, a cheery Indoor or Outdoor Fireplace, or ANY OTHER luxurious improvement imaginable—*all* are now within your grasp, FOR THE COST OF MATERIALS ALONE—with the aid of this amazing, *all-new* "AMATEUR BUILDER'S HANDBOOK"!

More than a book—it's almost like having 9-Books-in-One! A big volume of room-by-room instruction for modernizing ANY home—a complete handbook on EVERYTHING the average home-owner wants for ALL 9 handyman trades! 512 BIG PAGES—Over 1000 "Show-How" Illustrations—Over 300,000 clear, helpful words! Fingertip reference on 1,001 ways to *save* money—on fuel, insulation, plumbing, landscaping, roofing, painting, wiring—*and more!*

Indoors or Outdoors—Cellar to Attic—Porch to Kitchen—EVERY Modern Improvement You've Ever Desired, Fully Described and Illustrated!

THE money this giant book SAVES you can provide your family with those luxuries you've dreamed of! And, at the same time, you'll be modernizing, beautifying, even building a home to thrill your wife and amaze your neighbors. Imagine building that streamlined, completely modern Dream Kitchen and Hollywood Bath every woman yearns for! Install your own Heating System—build your own Stoker Bin! See NEW ways to get longer life out of household equipment. NEW ways to save on fuel—giant Heating Section alone may save you *hundreds of dollars!*

One of 6 simple steps showing you how to get perfect re-roofing—at big savings!

Save TIME—Save MONEY in Building or Remodeling ANY House!

From fixing leaky faucets to *complete* modernization, you get all picturized directions! Step-by-step illustrations, easy-to-follow text show you how to give your family a comfortable, spacious home that will be the showplace of your town! SAVE up to 70% on cost of insulating! Build all types of closets and cabinets, for the cost of materials alone! Give every room better lighting—*and much more!*

FREE!

64-Page Book—124 Pictures

Big 5½x8" book. Shows how to make valuable toys, gifts, home and garden furnishings, etc.—including wall desk, work bench, tool box, wastepaper basket, photograph enlarger, sand box, garden bench, trellises, corner shelf, drop-leaf table, cabinet, child's chair, book case, scores *more!* Simple 1-2-3 directions! Yours FREE even if you return "Amateur Builder's Handbook" after FREE Trial. *Mail coupon AT ONCE!*

SAVE $1.00 DISCOUNT
Mail FREE-Trial Coupon NOW!

Pay Miracle Low Price of Only **$2.95**

If you decide to keep it!

BEFORE you even think of buying this book, test it a full week FREE! If not convinced it will help you SAVE *at least $100.00 every year*, return it and owe nothing! Otherwise, keep it and remit only $1 monthly, until the miracle Discount Price of only $2.95 plus postage is paid.

But you *must* act NOW! Rising costs of paper and printing may soon compel us to go back to original planned price of $3.95. Avoid disappointment; SAVE $1.00. SEND NO MONEY—but mail FREE-Trial Coupon NOW!

Wm. H. Wise & Co., Inc., 50 W. 47th St., N. Y. 36, N. Y.

Rush FREE-Trial $1.00 Discount Coupon NOW!

Wm. H. Wise & Co., Inc., 50 West 47th Street, New York 36, N. Y.

Without obligation to me, rush me prepaid for FREE Trial the *all brand-new* "AMATEUR BUILDER'S HANDBOOK"!

After 7 days' FREE Trial, I'll return book and owe nothing. Or, if convinced this amazing Giant Book may save me $100.00 a year *or more*, I'll keep it and remit *NOT $3.95*—but only $1 monthly until miracle Discount Price of only $2.95 plus postage is paid.

FREE GIFT! In either case, valuable 64-Page fully illustrated "101 THINGS TO MAKE" is mine to keep FREE!

SAVE SHIPPING CHARGES! Send only $3 now and we will stand all packing, postage and insurance costs. Same return privilege and refund guaranteed.

58
804

MR. / MRS. / MISS .....
(PLEASE PRINT)

ADDRESS.....

CITY & ZONE..... STATE.....

☐ CHECK HERE to see De Luxe Edition, THUMB-NOTCHED. In Morocco-Grained binding. Only $1 extra. Same return privilege and terms.

America's Leading New-Idea Magazine for 82 Years

Founded 1872, Vol. 164: No. 4

POPULAR SCIENCE
REG. U. S. PAT. OFF. *Monthly*

Mechanics and Handicraft
REG. U.S. PAT. OFF.

April, 1954 **Page**

Climbers Seek Secrets of Untried Peak..... 97
Swanky New Ford Is Sweet and Low.....102
Economy-Size Nash Is Fast and Fancy.....106
How Missiles Would Defend Our Cities.....110
Nerve Gas Now Kills Bugs.....114
Push Buttons Operate New Dream Kitchen..120
Supercharger Hops Up '54 Kaiser.....124
How Louisville Sluggers Are Made.....132
An Atomic Locomotive Could Be Built.....137

SPECIAL 14-PAGE SECTION

Ways to Improve Your House and Grounds

Starting on page 225, a colorfully illustrated group of articles from California contributors shows how:

Dramatic Fences Serve Many Purposes 226
Garage Doors Can Be Beautiful, Too..231
Iron Gates Give Beauty and Security..233
Distinctive Shutters Add Gay Note.....236

He Shifts Gears with Faucets.....144
Young Scientists Win What They Want.....150
Stilts Get New Look, New Jobs.....156
Gus Defies the Elements.....158
Retopping a Convertible the Easy Way.....161
How to Run Many Tools with One Motor....166
De Luxe Power Tool Whips Out Homework 176
Tomorrow's Highways Blueprinted in 3-D..183
Gardening from the Saddle.....189
Cameras You Can Hide in a Hand.....194
A Boat That Anyone Can Build.....200
Tilt-Shelf Rack Holds Books at Angle.....206
Machining Your Own Milling Attachment..214
Tune Up Your Fishing Reel.....219
How to Power a Hand Mower.....241

(More features and departments are listed on page 4)

Editor
VOLTA TORREY

Managing Editor
HOWARD ALLAWAY

Art Editor
HOWARD C. JENSEN

Associate Editors
Alden P. Armagnac, Devon Francis, Sheldon M. Gallager, Wesley S. Griswold, Hartley E. Howe, Herbert O. Johansen, Martin Mann, Herbert R. Pfister, Ruth Westphal.

Art
Harry Samuels (Director), Herbert Anthony, Henry B. Comstock, Mary E. Dee, Eric A. Karminski Jr., Leland H. Sweet.

Copy
Kendall W. Goodwyn (Director), Carol Ennis, Everett H. Ortner, Georgette Sparks.

Photography
W. W. Morris (Director), Hubert Luckett, Orlando Guerra.

Assistant Managing Editors
Frank Rowsome Jr.
Robert P. Stevenson

Mechanics and Handicraft
Harry Walton

Midwestern Editor
Kenneth Wylie (Chicago)

Western Editor
Andrew R. Boone (Los Angeles)

Editorial Assistants
Harriet Trowbridge, Stanley Beitler, Louise Levis, Trudie Ray, Teresa Robbins, Grace A. Schwartz, Rose Weil.

Publisher
GODFREY HAMMOND

Advertising Director
STEPHEN P. GLENNON

Circulation Director
EUGENE WATSON

ADVERTISING OFFICES: NEW YORK—353 Fourth Ave.; CHICAGO—360 North Michigan Ave.; DETROIT—820 Book Bldg.; SAN FRANCISCO—681 Market St.; CLEVELAND—328 Citizens Bldg.; LOS ANGELES—2550 Beverly Blvd.

EDITORIAL OFFICES: 353 Fourth Avenue, New York 10, N. Y.

Published monthly at 353 Fourth Avenue, New York 10, N. Y., by Popular Science Publishing Co., Inc., Godfrey Hammond, President and Treasurer; R. C. Wilson, Stephen F. Glennon, Vice-Presidents; F. W. Briggs, Secretary. Entered as second-class matter Dec. 28, 1918, re-entered as second-class matter July 26, 1948, at the Post Office in New York, N. Y., under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U.S.A.
Copyright, 1954, by Popular Science Publishing Co., Inc. All rights reserved in the United States, Great Britain, and in all the countries participating in the International Copyright Convention and Pan-American Copyright Convention.
Yearly subscriptions to United States, its possessions and Canada, $3.00 (2 years, $5.50; 3 years $7.50); foreign countries $1 per year extra. Four weeks' notice is needed to change a subscriber's address. Please give both old and new addresses, including postal zone numbers.

FOR REAL **JOB SECURITY** —GET **I.C.S.** TRAINING

"You can stop worrying, Jane. My job's secure now! And here's the insurance policy to prove it—my I.C.S. diploma!"

This feeling of security is probably typical of every I.C.S. graduate. Because—as the job situation gets tighter, the man with I.C.S. training has the advantage.

Why? Your I.C.S. diploma tells your present employer three important things: (1) You want to make the most of your present job. (2) You have the training you need for advancement. (3) You look for better ways of doing things *on your own.*

What you do about your future is up to *you.* Do nothing and stay at your present job at the same old pay. Or earn an I.C.S. diploma in your spare time for *security, promotions, more pay!* Your first step is to mark the course that interests you in the coupon below, and mail it to us.

Free books

We'll send you two interesting books. The first, "How to Succeed," is a gold mine of helpful tips. Points out many small things in your personality and behavior that can make the difference between success and failure. The second book tells you about the opportunities in the field of your choice.

Costs *pennies* a day

Many an I.C.S. student has made up the cost of his course in one month with the salary increase his I.C.S. training earned for him. By studying at home in your spare time, you pay yourself many times an hour more than you're now making. (One student reports—"My I.C.S. course was worth $95 an hour to me.")

The security of your present job—or the success in finding the new job you've always wanted—is in *your* hands. Move ahead with I. C. S. training while others stay behind on the routine, small-pay jobs. Remember, your first step to security and success is to mail this coupon. Take a few minutes and do it *now.* If you put it off, it can cost you your future.

I.C.S., Scranton 9, Penna.

INTERNATIONAL CORRESPONDENCE SCHOOLS ICS

BOX 7675-N, SCRANTON 9, PENNA.

Without cost or obligation, send me "HOW to SUCCEED" and the booklet about the course BEFORE which I have marked X:

ART
- ☐ Commercial Art
- ☐ Magazine Illustrating
- ☐ Fashion Illustrating
- ☐ Cartooning
- ☐ Sketching and Painting
- ☐ Show Card and Sign Lettering

AUTOMOTIVE
- ☐ Automobile, Mechanic
- ☐ Auto Elec. Technician
- ☐ Auto Body Rebuilding and Refinishing
- ☐ Diesel—Gas Engines

AVIATION
- ☐ Aeronautical Engineering Jr.
- ☐ Aircraft Engine Mechanic
- ☐ Airplane Drafting

BUILDING
- ☐ Architecture
- ☐ Arch. Drafting
- ☐ Building Contractor
- ☐ Estimating
- ☐ Carpenter and Mill Work
- ☐ Carpenter Foreman
- ☐ Reading Blueprints
- ☐ House Planning
- ☐ Plumbing
- ☐ Heating
- ☐ Painting Contractor
- ☐ Air Conditioning
- ☐ Electrician

BUSINESS
- ☐ Business Administration
- ☐ Certified Public Accountant
- ☐ Bookkeeping and Accounting
- ☐ Office Management
- ☐ Stenography and Typing
- ☐ Secretarial
- ☐ Federal Tax
- ☐ Business Correspondence
- ☐ Letter-writing Improvement
- ☐ Personnel and Labor Relations
- ☐ Advertising
- ☐ Retail Business Management
- ☐ Managing Small Business
- ☐ Ocean Navigation
- ☐ Sales Management
- ☐ Short Story Writing
- ☐ Creative Salesmanship
- ☐ Traffic Management

CHEMISTRY
- ☐ Chemical Engineering
- ☐ Chemistry
- ☐ Analytical Chemistry
- ☐ Petroleum—Nat'l Gas
- ☐ Pulp and Paper Making
- ☐ Plastics

CIVIL, STRUCTURAL ENGINEERING
- ☐ Civil Engineering
- ☐ Structural Engineering
- ☐ Surveying and Mapping
- ☐ Structural Drafting
- ☐ Highway Engineering
- ☐ Reading Blueprints
- ☐ Construction Engineering
- ☐ Sanitary Engineering

DRAFTING
- ☐ Aircraft Drafting
- ☐ Architectural Drafting
- ☐ Electrical Drafting
- ☐ Mechanical Drafting
- ☐ Structural Drafting
- ☐ Sheet Metal Drafting
- ☐ Ship Drafting
- ☐ Mine Surveying and Drafting

ELECTRICAL
- ☐ Electrical Engineering
- ☐ Electrician
- ☐ Electrical Maintenance
- ☐ Electrical Drafting
- ☐ Electric Power and Light
- ☐ Lineman

HIGH SCHOOL
- ☐ High School Subjects
- ☐ Mathematics
- ☐ Commercial
- ☐ Good English

MECHANICAL AND SHOP
- ☐ Mechanical Engineering
- ☐ Industrial Engineering
- ☐ Industrial Supervision
- ☐ Foremanship
- ☐ Mechanical Drafting
- ☐ Machine Design-Drafting
- ☐ Machine Shop Practice
- ☐ Tool Design
- ☐ Industrial Instrumentation
- ☐ Machine Shop Inspection
- ☐ Reading Blueprints
- ☐ Toolmaking
- ☐ Gas—Electric Welding
- ☐ Heat Treatment—Metallurgy
- ☐ Sheet Metal Work
- ☐ Sheet Metal Pattern Drafting
- ☐ Refrigeration

POWER
- ☐ Combustion Engineering
- ☐ Diesel—Electric
- ☐ Electric Light and Power
- ☐ Stationary Steam Engineering
- ☐ Stationary Fireman

RADIO, TELEVISION COMMUNICATIONS
- ☐ Practical Radio—TV Eng'r'ing
- ☐ Radio Operating
- ☐ Radio and TV Servicing
- ☐ Television—Technician
- ☐ Electronics
- ☐ Telephone Work

RAILROAD
- ☐ Locomotive Engineer
- ☐ Diesel Locomotive
- ☐ Air Brakes ☐ Car Inspector
- ☐ Railroad Administration

TEXTILE
- ☐ Textile Engineering
- ☐ Cotton, Rayon, Woolen Mfg.
- ☐ Carding and Spinning
- ☐ Warping and Weaving
- ☐ Loom Fixing ☐ Throwing
- ☐ Finishing and Dyeing
- ☐ Textile Designing

Name_____ Age_____ Home Address_____

City_____ Zone_____ State_____ Working Hours_____ A.M. to P.M._____

Occupation_____

Canadian residents send coupon to International Correspondence Schools Canadian, Ltd., Montreal, Canada. . . . Special tuition rates to members of the U. S. Armed Forces.

Major Car Manufacturers Approve Amazing PROTO Torquer!

Built-in Ratchet Head Model

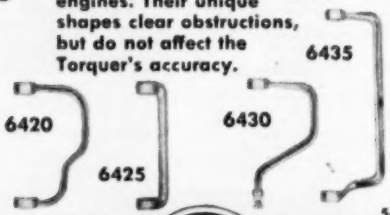
Head Only of Plain Head Model

In your service work, follow the lead of several car manufacturers who made comparative tests and found that the sensational PROTO Torquer is faster, sturdier, and more accurate than indicating types. You'll like its automatic torque-*limiting* release, trouble-free construction, micrometer-type adjustment, and lack of pointers and dials. Various sizes are available in foot-pound or inch-pound models, with plain or reversible ratchet head. Start saving precious time now by buying the models you need from your PROTO dealer. Send 10¢ for 68-page catalog to

PLOMB TOOL COMPANY
2257K Santa Fe Ave.,
Los Angeles 54, Calif.

NEW! *Torquer Adapters*

These four new torque wrench adapters simplify torquing on overhead valve engines. Their unique shapes clear obstructions, but do not affect the Torquer's accuracy.



5481

PROTO TOOLS
PROTO means PROfessional TOols

Eastern Factory—Jamestown, N.Y.
Canadian Factory—London, Ont.

News and Pictures

"Lowest-Priced Car" Here from Britain..119
Underwater TV Camera Has Roving Eye 143
New Atom Smasher to Be Biggest.....148
College Examiner Is Rough on Nails.....174

Mechanics and Homebuilding

How to Build a Roadside Wash-Up Kit..171
Crib Parts Grow Up into a Sofa.....188
Build This Legless Dressing Table.....193
Table Lamp Is Fish Tank, Too.....198
Convertible Wheelbarrow Eases Chores..246

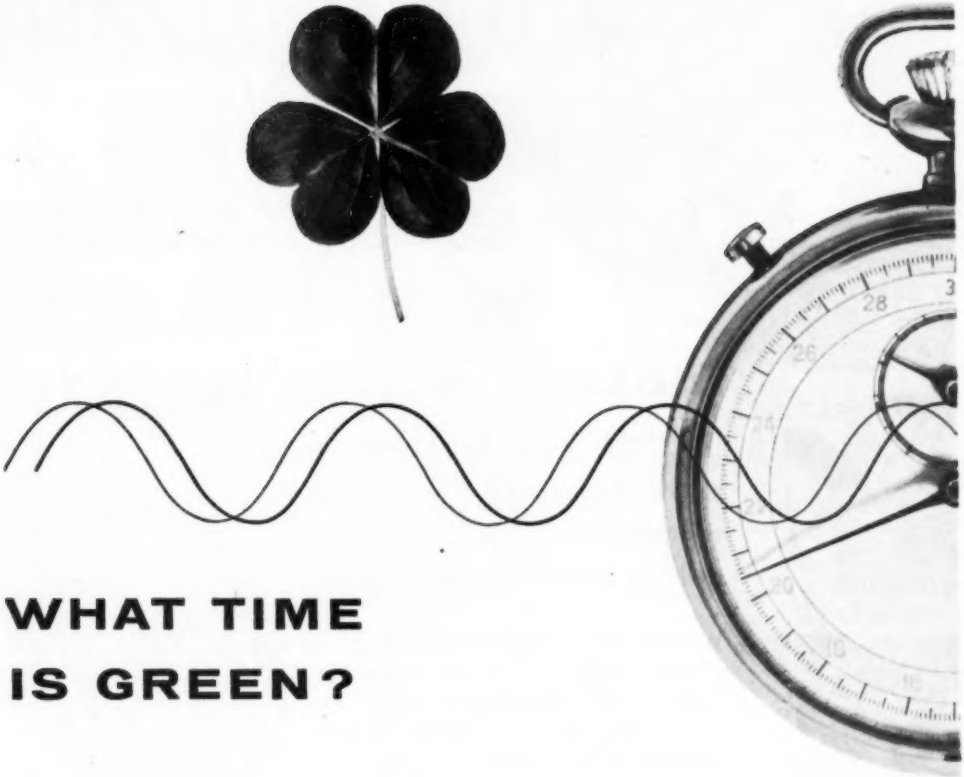
Departments

Letters..... 12
Last-Minute News and Notes..... 94
New Ideas from the Inventors.....129
I'd Like to See Them Make.....154
New for the Handy Man.....169
Wordless Workshop 186
New Tools 205
Keeping the Home Shipshape.....209
One-Evening Shop Projects.....212
Craftsmen at Work.....248
New Shop Ideas.....252
Hints from the Model Garage.....261
How Much Did You Learn?.....294

The Story Behind the Picture

Bill (W.W.) Morris, the man with the flying coattails in the photo above, shot the vivid color picture of the new baby Nash on this month's cover.

He found it the knottiest assignment he's had since he founded PSM's photographic department 13 years ago. For five wintry days, Morris, two men from Nash Motors, four men from TWA and our Midwestern Editor tried to bring the Nash, the big cargo plane, the two lift trucks and Chicago's elusive January sunlight together at one time. On the fifth day, during a tingling half hour when practically everybody held his breath, the trick was turned and Bill's shutter clicked.



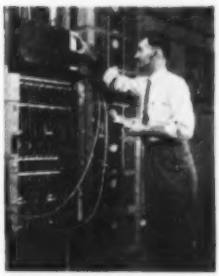
WHAT TIME IS GREEN?

In color television, the colors on the screen are determined in a special way. A reference signal is sent and then the color signals are matched against it. For example, when the second signal is out of step by 50-billionths of a second, the color is green; 130-billionths means blue.

For colors to be true, the timing must be exact. An error of unbelievably small size can throw the entire picture off color. A delay of only a few billionths of a second can make a yellow dress appear green or a pale complexion look red.

To ready the Bell System's television network for color transmission, scientists at Bell Telephone Laboratories developed equipment to measure wave delay to one-billionth of a second. If the waves are off, as they wing their way across the country, they are corrected by equalizers placed at key points on the circuit.

This important contribution to color television is another example of the pioneer work done by Bell Telephone Laboratories to give America the finest communications in the world.



To keep colors true in television, signals must be kept on one of the world's strictest timetables. Equalizers that correct off-schedule waves are put into place at main repeater stations of the transcontinental radio-relay system.

BELL TELEPHONE LABORATORIES

IMPROVING TELEPHONE SERVICE FOR AMERICA PROVIDES CAREERS FOR CREATIVE MEN IN SCIENTIFIC AND TECHNICAL FIELDS.

STUCK....? Liquid WRENCH loosens it...in seconds!

MECHANICS save time, hard work!

FARMERS make repairs faster!

PLUMBERS use it every day!

SPORTSMEN clean guns, rods, reels!

This powerful blend of quick-acting solvents loosens rust and corrosion instantly... quickly frees "frozen" joints.

Whether it's a bolt stuck fast by a winter's rust . . . a badly corroded joint . . . or a tire bead "glued" to a rusty rim, world-famous LIQUID WRENCH will loosen it . . . fast . . . and without breakage!

For the Home Handyman and Professional Alike

"IT MELTS THE RUST AWAY"

Safe for all metals and alloys

LIQUID WRENCH contains no acids, ether or alkalies. It is absolutely harmless to metals, works equally well on all metals and alloys.

HANDY 3-OZ. APPLICATOR CAN FOR HOME USE. *Only* **30c**

LARGER SIZES AVAILABLE from 8 OZ. to 5 GALLONS.

AT HARDWARE STORES, SERVICE STATIONS, GARAGES AND PLUMBERS . . . EVERYWHERE

If your dealer can't supply you, write

RADIATOR SPECIALTY CO.
CHARLOTTE, NORTH CAROLINA
IN CANADA: Radiator Specialty Co. Ltd. • Toronto

SOLDER SEAL

Protect it... ACRA-SEAL it!

Waterproof, dustproof, smear-proof it, in one quick, easy application. Acra-Seal forms a clear, transparent, pliable, waterproof coat on any surface—metal, wood, paper or paint.

Just spray it on!

THOUSANDS FIND NEW INTEREST, NEW HAPPINESS IN LIFE!

FUN FOR ALL AT OUR STUDENT-TEACHER PARTIES! Everybody is invited to these gay, get-together parties and what a time you have! Making new friends, learning new dances, practicing up on new steps.

See For Yourself How A Few Hours At Arthur Murray's Opens The Door To Good Times And Popularity

Join the happy group who have found that dancing can lead the way to confidence and fun. Come to Arthur Murray's. Hundreds of thousands of shy people have become gay extroverts almost overnight through learning to dance the Arthur Murray Way. You see Arthur Murray has so perfected his teaching methods that anyone, even a beginner, can go dancing after just a few lessons. Then, too, Arthur Murray combines lessons with parties so that you get real ballroom experience while you learn. So don't miss out on good times any longer. Visit your Arthur Murray studio now. See coupon below for free offer.

HOW OTHERS HAVE FOUND POISE, NEW CONFIDENCE AT ARTHUR MURRAY'S

"I thought learning to dance would be hard and take forever. Was I surprised when I found I could actually dance after my very first lesson and that the lessons were fun, too. And what a wonderful time I've had ever since," says Arthur Murray student, Martha Stone.

"I never danced and was too shy to learn. Just a few lessons at Arthur Murray's changed all that," says Paul Chauvin, Arthur Murray graduate. "Now I have more confidence and really enjoy myself at parties."

MEET JOYCE LYONS, a typical Arthur Murray teacher, pleasing personality, anxious to help others.

Exclusive Arthur Murray "Magic Step" Makes Learning to Dance Faster...More Fun!

© Arthur Murray, Inc.

Free DANCE BOOK AND 2 STUDIO LESSONS

Send this coupon to your nearest
ARTHUR MURRAY STUDIO
(Consult your telephone directory)

Gentlemen:
Send me the new "Murray-Go-Round", 64 pages of dancing hints, news and studio information. I'm sending this coupon in right away so that I will get a certificate for 2 FREE half-hour dance lessons.

NAME _____ PHONE NO. _____
ADDRESS _____
CITY _____ STATE _____

PN-4-54

The Boat Sensation of the Nation!

Get YOUR greatest enjoyment in the natural setting of the outdoor world . . . among the best of companions . . . gliding along in easy-chair comfort for luxurious relaxation or glorious action, once you own

YOUR SMART and USEFUL

FOLBOT

FOLDING BOAT

BIG CRAFT NOW ONLY $95 up

SAIL RIGS from $29

SAFEST and SEAWORTHY

Wide protective decks, low gravity center, balanced seating, high or low. Very substantial framework. Leakproof, rock-resistant heavy duty hull, of extra tough multi-ply canvas, compressed rubber—strong, tenacious, tire-like construction. CAN'T SINK with INVISIBLE airtanks for maximum space & loads to 2000 lbs. Steadier, sturdier, GUARANTEED widest WATERLINE STABILITY — acclaimed since 1933 by thousands of happy Folboters, Champions, Guides, Scouts, Explorers & Navy.

EASIER FISHING

BETTER HUNTING

Newest Style,

YACHT-SMART FOLBOT SAILS . . .

another Folbot advantage

NEW Largest Folding RUNABOUT

another Folbot exclusive with rigidly INTERLOCKING frames. Provides the ULTIMATE COMFORT for You and YOUR entire FAMILY. Faster, smoother with any outboard up to 16 H.P. Speeds 25 m.p.h. with ideal 5 to 7½ H.P.

Many models, styles, colors. 1 to 4 seaters with swivel backrests. Each takes motor, sails, or paddles. No upkeep!

LASTS LONGER THAN A CAR

©

FOLDS

in 2 light bags —erects in a jiffy! Fits INSIDE car trunk or rides erected on top.

FREE

ACTION CATALOGUE

MAIL COUPON TODAY!

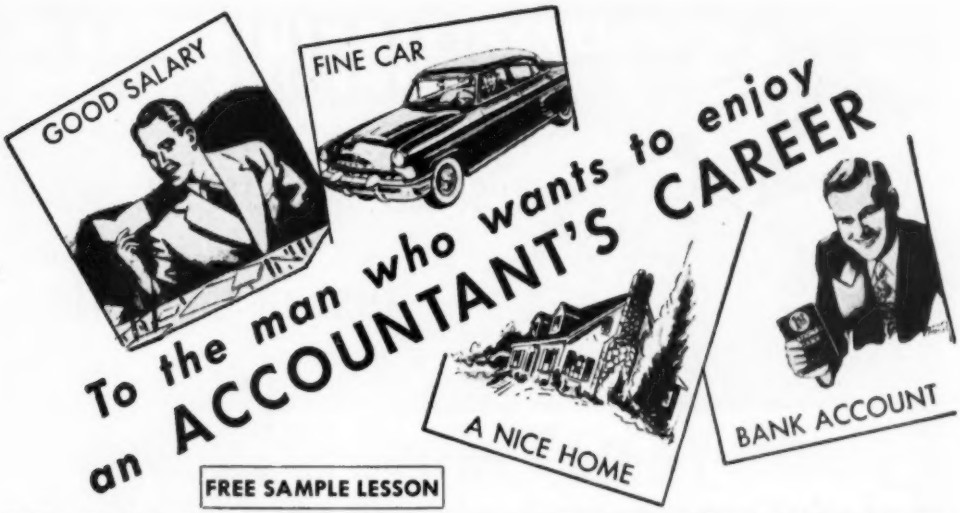
TO: FOLBOT CORPORATION

Stark Industrial Park, PS, Charleston, S.C.

NAME .....

ADDRESS .....

CITY ..... STATE .....



To the man who wants to enjoy an ACCOUNTANT'S CAREER

FREE SAMPLE LESSON

IF you're that man, here's something that will interest you.

Not a magic formula—not a get-rich-quick scheme—but something more substantial, more practical.

Of course, you need something more than just the desire to be an accountant. You've got to pay the price—be willing to study earnestly, thoroughly.

Still, wouldn't it be worth your while to sacrifice some of your leisure in favor of interesting home study—over a comparatively brief period? Always provided that the rewards were good—a salary of $4,000 to $10,000?

An accountant's duties are interesting, varied and of real worth to his employers. He has *standing!*

Do you feel that such things aren't for you? Well, don't be too sure. Very possibly they *can* be!

Why not, like so many before you, investigate LaSalle's modern Problem Method of training for an accountancy position?

Just suppose you were permitted to work in a large accounting house under the personal supervision of an expert accountant. Suppose, with his aid, you studied accounting principles and solved problems day by day—easy ones at first—then more difficult ones. If you could do this—and could turn to him for advice as the problems became complex — soon you'd master them all.

That's the training you follow in principle under the LaSalle Problem Method.

Over 4,000 Certified Public Accountants among LaSalle alumni

You cover accountancy from the basic Principles right up through Accountancy Systems and Income Tax Procedure. Then you add C. P. A. Training and prepare for the C. P. A. examinations.

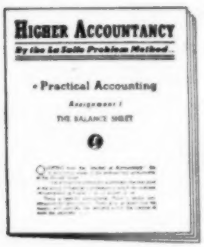
As you go along, you absorb the principles of Auditing, Cost Accounting, Business Law, Statistical Control, Organization, Management and Finance.

Your progress is as speedy as you care to make it—depending on your own eagerness to learn and the time you spend in study.

Will recognition come? The only answer, as you know, is that success *does* come to the man who is really *trained*. It's possible your employers will notice your improvement in a very few weeks or months. Indeed, many LaSalle graduates have paid for their training—with increased earnings—before they have completed it! For accountants, who are trained in organization and management, are the executives of the future.

Get Free Sample Lesson—Also "Accountancy, The Profession That Pays"

For your own good get all the facts. Write for Free Sample Lesson—also 48-page book "Accountancy, The Profession That Pays." They will prove that Accountancy offers brilliant futures to those who aren't afraid of serious home study, and will show the wide range of opportunities that exist today. No cost or obligation. If you want a position of higher income, greater prestige and professional standing . . . MAIL THE COUPON NOW!



LASALLE EXTENSION UNIVERSITY
A CORRESPONDENCE INSTITUTION

417 S. Dearborn St. Dept. 483H Chicago 5, Ill.

I want to be an accountant. Send me without obligation, Free Sample Lesson—also "Accountancy, The Profession that Pays."

Name..... *Age*.....

Address.....

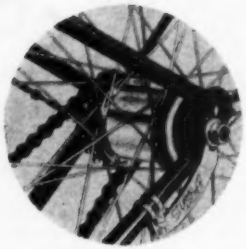
City, Zone & State.....

only RALEIGH has it!

3-SPEED and COASTER HUB

first in the world

Prices FOB Boston
Dynohub lighting additional



Ride the newest, most exciting Raleigh of them all—the beautiful Sports Light Coaster with the new Tri-Coaster Hub!

The Sports Light Coaster, only bicycle with a safe, safe coaster brake and 3-speed gear! All this plus an emergency front hand brake.

Only Raleigh has this EXCLUSIVE Tri-Coaster Hub!

The Sports Light Coaster **$69.75**

And don't forget the handsome precision-built Sports Light Roadster, easy-to-handle Raleigh favorite at only **$63.75.**

Write to

Raleigh Industries of America, Dept. P · 687 Boylston St. · Boston 16, Mass.

It's easy to make these

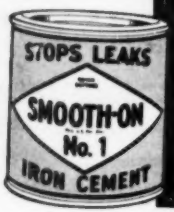
REPAIRS

You can make loose metal, wood, or plastic parts tight; anchor bolts in concrete to stay; seal cracks in metal; tighten loose screws and fixtures in wood, metal or tile—with Smooth-On No. 1, the iron cement of many uses. Just mix, and fix. Smooth-On No. 1 hardens quickly like iron, and expands as it sets. Forced into any opening, its unique expanding action makes the repair. Keep a can on hand, it will not deteriorate. Smooth-On No. 1 is at your hardware store.

FREE *Repair Handbook*

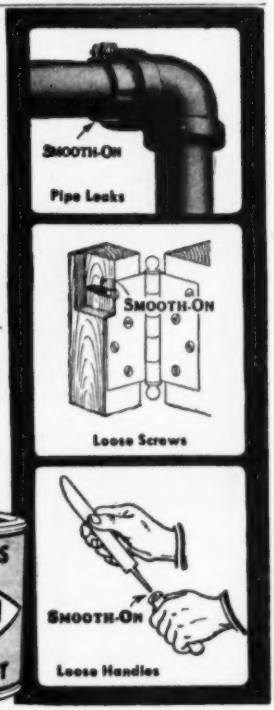
40 pages, many illustrations, easy directions for ingenious time and money saving repairs you can make yourself. Write for your free copy.

SMOOTH-ON MFG. CO., Dept. 58D
570 Communipaw Ave., Jersey City 4, N. J., U.S.A.



SMOOTH-ON

THE IRON CEMENT OF MANY USES



60-691

BE A RADIO-TELEVISION TECHNICIAN

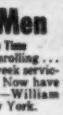
America's Fast Growing Industry Offers You a Bright Future

J. E. SMITH, President, National Radio Institute, has trained more men for Radio-Television than any other man. Our 40th Year.

I Will Train You at Home in Spare Time for Good Paying Jobs in RADIO-TELEVISION

I Trained These Men

Extra Money in Spare Time
"Four months after enrolling . . . averaged $10 to $15 a week servicing sets in spare time. Now have full-time business."—William Weyde, Brooklyn, New York.



Business Continues to Grow
"Becoming an expert Teletrician as well as Radiotrician. Impossible without your course. Business continues to grow."—Philip G. Brogan, Louisville, Kentucky.

Broadcast Engineer at WLPM
"I am Broadcast Engineer at WLPM. Another technician and I have opened a Radio-Television service shop in our spare time."—J. H. Bangley, Jr., Suffolk, Va.

Video Control Engineer
"My position with WNBT is video control engineer on the RCA color project. I owe a lot of my success to your textbooks." Warren Deem, Malverne, N. Y.

TELEVISION is Making Good Jobs, Prosperity

Radio, even without Television is bigger than ever. 115 million home and auto radios and 3000 Radio Broadcasting Stations give interesting jobs to service technicians, operators, engineers. NOW ADD TELEVISION. 25 million TV homes and the total growing rapidly. 200 Television stations on the air, hundreds more under construction. Color Television soon to be a reality. All this adds up to good pay now, a bright future for men who qualify.

You Practice Broadcasting-Servicing with Kits of Parts I Send

Nothing takes the place of practical experience. That's why NRI training is based on learning by DOING. My training includes specially developed kits of parts you use to build equipment and get practical experience on circuits common to both Radio and Television. Shown at left is the low power Broadcasting Transmitter you build as part of my Communications Course. Also shown is modern Radio you build as part of my Servicing Course. My free book tells about other equipment you build. Mail coupon. All equipment is yours to keep.

AVAILABLE TO VETERANS UNDER GI BILLS

America's Fast Growing Industry Offers You GOOD PAY - BRIGHT FUTURE - SECURITY

Training PLUS opportunity is the PERFECT COMBINATION for job security, advancement. When times are good, the trained man makes the BETTER PAY, gets PROMOTED. When jobs are scarce, the trained man enjoys GREATER SECURITY. NRI training can help assure you and your family more of the better things of life.

Start Soon to Make $10, $15 a Week Extra Fixing Sets

An important benefit of my Radio-Television training is that you can start to cash in fast. I start sending you special booklets that show you how to fix sets the day you enroll. Multitester you build with parts I send helps you discover and correct troubles, helps you make money fixing neighbors' sets in spare time while training. Many NRI students make $10, $15 a week extra this way. My training is practical, complete. You benefit by my 40 years' experience training men at home. My well-illustrated lessons give you basic principles you need, and my skillfully developed kits of parts "bring to life" things you learn from the lessons.

Find Out About This Tested Way to Better Pay — Mail Coupon

Without obligating you in any way, I'll send an Actual Lesson to prove that my training is practical, thorough. My 64-page book, "How to be a Success in Radio-Television," shows what my graduates are doing, earning. It gives important facts about your opportunities in Radio-Television, tells about kits I furnish for practical experience. You don't have to leave home or give up your job to take NRI course. You learn at home in your spare time on terms as low as $5 a month. Many of my graduates make more than the total cost of my training in just two weeks. Mail coupon below now to J. E. SMITH, President, National Radio Institute, Dept. 4DB, Washington 9, D. C. Our 40th Year.

Good for Both - FREE

Mr. J. E. SMITH, President, Dept. 4DB
Washington 9, D. C.

Mail me Sample Lesson and 64-page Book FREE. (No salesman will call. Please write plainly.)

Name ..... Age .....

Address .....

City ..... Zone ..... State .....

VETS Write in date of discharge .....

Letters

Ha-Ha, No Boo-Boo!

In your article on the new Buick [Feb., p. 146], you remarked, "The company remains one of two in the U.S. (Nash Ambassador is the other) using a torque-tube drive." If I am not mistaken, my '54 Chevvy has a torque-tube drive—unless I have a hybrid or something. Didn't you make a boo-boo?

S. E. Fried, Omaha, Neb.

Nope. Your Chevvy has a Hotchkiss drive. That sheath around your drive shaft has a slip joint at the bell housing that slides back and forth as much as 1½ to 2 inches. Some rigidity probably results, but the torque from your rear wheels is transmitted through your rear springs.

Nostalgia Won His Heart

I sure liked your 1954 Auto Show in the February issue. The way you wrote up

the 1904 Auto Show and the cars that were popular then was alone worth the price. . . Please keep those old-car, new-car, hot-rod, sports-car articles coming. I eat them up.

Norman J. Geary, St. Louis, Mo.

Paper Race Among Clippers

You told R. J. Dixon in your February Letters column [p. 26] that you were "glad to credit the *Cutty Sark* with the record for top [clipper ship] speed." Please let me make a correction there.

The *Sovereign of the Seas* has been offi-

"Here's the new greaseless way to keep your hair neat all day,"

says Arthur Godfrey

Even Mr. G.'s tousled cowlicks stay put after he uses new Vitalis Hair Tonic with V-7. "It works for me even after a shampoo," he says. "That means it'll work for anybody."

V-7, Vitalis' new *greaseless* grooming ingredient, makes even dry, unruly hair easy to manage. Yet it never gives an over-slick, plastered-down look. And Vitalis prevents dryness—maintains hair's natural moisture balance better than any other leading tonic.

Try new Vitalis yourself! And don't miss the new "Arthur Godfrey Digest." CBS Radio Network, Fridays, 8:30-9:30 PM, EST.

New VITALIS® Hair Tonic with V-7

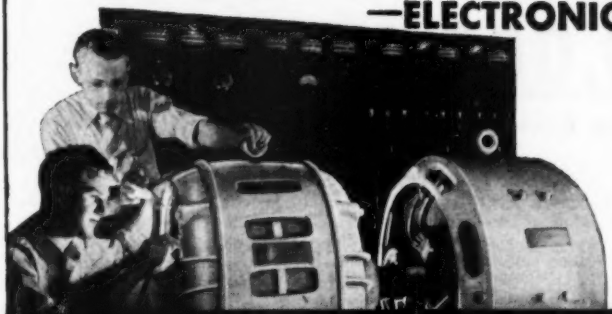
PRODUCT OF BRISTOL-MYERS

THESE MEN ARE GETTING PRACTICAL TRAINING

IN ELECTRICITY

—ELECTRONICS

On Real:



A.C. and D.C. MOTORS
GENERATORS
SWITCHBOARDS
CONTROLLERS
WIRING JOBS
APPLIANCES
ELECTRONIC UNITS

(Shown at left—Instructor explaining operation and testing of a large Motor Generator in our A.C. Department.)

AND TELEVISION-RADIO

On Real:

TELEVISION SETS
RADIO RECEIVERS
F.M.
(Frequency Modulation)
ELECTRONICS
RECORD CHANGERS
AUTO RADIOS
PUBLIC ADDRESS Systems

(Right—Instructor helping students check the wiring and trace circuits of television receivers.)

Train in the great SHOPS of COYNE

Largest, Oldest, Best Equipped School Of Its Kind In The U. S.

Whether 17 or up to 45 years of age, prepare for your future now. Don't be satisfied with a "No Future" job. Train the Coyne way for a better job *in a field that offers a world of opportunities in the years ahead.*

FINANCE PLAN Enroll now, pay most of tuition later. **Part-time employment service while training, if needed.**

WE TRAIN YOU IN CHICAGO. At **Coyne** you learn on real, full-size equipment. Trained instructors show you how, then you do practical jobs yourself. No previous experience or advanced education needed.

CLIP COUPON NOW for big new illustrated **Coyne** book "Guide to Careers in ELECTRICITY and TELEVISION-RADIO". No obligation; *no salesman will call.* Get vital facts now!

B. W. COOKE, Pres. **COYNE** FOUNDED 1899
ELECTRICAL SCHOOL
A TECHNICAL TRADE INSTITUTE CHARTERED NOT FOR PROFIT
500 S. PAULINA St., CHICAGO, Dept. 44-73H
ELECTRICITY ★ RADIO ★ TELEVISION ★ REFRIGERATION ★ ELECTRONICS

Mail Coupon for Big Free Book

APPROVED FOR VETERANS

B. W. COOKE, President
COYNE ELECTRICAL SCHOOL
500 S. Paulina St., Chicago 12, Ill. Dept. 44-73H

Send BIG FREE book and details of your training offer. This does not obligate me and no salesman will call. I am interested in:

☐ ELECTRICITY ☐ TELEVISION-RADIO

NAME .....

ADDRESS.....

CITY.....STATE.....

Reading time: 3 minutes to learn how to

- **cut engine wear up to 38%**
- **prevent loss of power, compression**
- **save 15%-25% on oil . . . without ever changing your oil filter**

This Gadget is Worth $320,000,000

...and I Discovered it by Accident!

by Albert Wells

IT ALL STARTED the day I got the bill: $214.36 for an engine overhaul—and I had only 28,000 miles on the car!

I told my troubles to a neighbor—a lubrication engineer—told him how I'd always changed oil every 1500 miles, changed filters every 5,000 miles. His answer floored me.

"You've been wasting your money," he said. "We've spent millions developing oil additives that keep carbon, gum and abrasives from damaging your engine. Your oil costs about 15¢ more a quart because of those additives. Yet oil filters on the market today are made of rag or paper—they soak up additives like a blotter. The more often you change oil filters the more money you waste!"

"But don't I need a filter to take the impurities out of the oil?" I asked.

He took a deep breath. "This will really shock you. Engine damage is done by abrasives 10 to 40 microns in size (a micron is .000039"). Your oil filter can't take them out because rags or paper can't be packed tight enough without stopping oil flow when the fibers soak up oil and expand."

"Isn't there any kind of filter that does the job it's supposed to do?"

"No, except for the porous bronze filters they're making for supersonic aircraft. And you can't buy a filter like that for your car."

I asked myself: "Why not?" Next day, I tracked down the outfit that was making the filters for aircraft, and got the answer. These porous bronze filters were made by fusing together millions of tiny bronze balls. Non-absorbent, they didn't remove additives, yet they removed abrasives in the 10-to-40 micron danger zone. Could they be made for automobiles? Again, the answer floored me.

LIFETIME FILTER TESTED IN CARS, TRUCKS, BOATS

Test models had already been used in cars and trucks for millions of miles, proving the porous bronze filter: 1. Never needs replacing. 2. Saves the quart of oil thrown away with ordinary filter packs. 3. Increases engine life.

Trouble was, almost the entire production was being absorbed by military and industrial users.

That day I went to work on the biggest job of my life: setting up production of the Lifetime porous bronze permanent filters for cars and trucks (an estimated $320,000,000 replacement industry).

HOW TO GET A LIFETIME FILTER FOR YOUR CAR

Try the Lifetime filter on your car for 2 weeks: if it isn't all I say, you get your money back; if you keep it, you're through buying filter packs—the Lifetime filter is guaranteed for 10 years, actually will last many times that long.

For complete unit, including case and fittings (install on any car in 10 minutes), send make, year and model of your car and $12.95 (we pay shipping).

For conversion kit, which replaces your present filter pack with Lifetime bronze, send make and number of filter and $6.95 (we pay shipping).

Or send only $2 deposit, pay C.O.D. charges on arrival. But do it today—don't waste another cent on filter pack replacements!

Complete Lifetime Filter; fits any car.

Lifetime Conversion Kit; replaces ordinary packs with permanent bronze element.

OPPORTUNITY FOR DEALERS AND DISTRIBUTORS

A dealer and distributor network is now being formed to handle demand generated by advertising and editorial features in national magazines. If you can qualify, you can be first with the most exciting automotive product of this decade, to win new customers and build a substantial business. These valued franchises are not being sold; they are awarded on the basis of ability to grow with us. For complete details, write or wire: Continental Manufacturing Corporation, Dept. FPS-4, Washington Blvd. & Motor Avenue, Culver City, Calif.

©1954

Permanent Filter Division, Dept. FPS-4
CONTINENTAL MANUFACTURING CORP.
Washington Blvd. at Motor Ave., Culver City, Calif.

Ship ☐ complete unit ☐ conversion kit

Make, model, year of car: _____

Present filter make (if known) _____

I enclose ☐ $12.95 for complete unit ($18.95—chrome)
☐ $6.95 for conversion kit
☐ $2.00 deposit; send C.O.D.

Name _____

Address _____

City _____ Zone _____ State _____

INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

CLARENCE A. O'BRIEN & HARVEY JACOBSON

Registered Patent Attorneys

42-D DISTRICT NATIONAL BUILDING

WASHINGTON 5, D. C.

"Cake"-*not wood*
mellows
your smoke

and the exclusive
honey lining
cakes Yello-Bole imported briar far faster than any pipe at any price!

From the first puff, Yello-Bole's real honey builds up a healthy, protective cake. It mellows the smoke, absorbs tars and resins. The filter *refines* the rest. Yello-Bole smokes so clear, clean, cool and sweet you don't have to inhale to enjoy it. Treat yourself to a healthier-smoking, honey-lined Yello-Bole—in handsome new shapes and finishes!

PROOF?
Yello-Bole is the world's largest selling pipe

YELLO-BOLE
$1.00 TO $2.50

cially credited with having traveled at a rate of 19 knots—during the record run of 3,562 miles in 11 days that you mentioned—for three consecutive hours.

Just to set matters straight on the question of actual top speed, it should be noted that the *James Baines*, built by the same Donald MacKay who built the *Sovereign*, made 21 knots.

In all fairness to the *Cutty Sark*, it should also be noted that the larger a ship, the higher its top speed will be, other factors being equal. Since both the *James Baines* and the *Sovereign* were larger than the *Cutty Sark*, this probably accounts to a certain extent for the differences in their respective top speeds.

DAVID RICHARDSON, Madison, Ill.

We would have liked to line the three ships up on a day of fair wind and settle this dispute for all time.

A Cure for Noisy Drivers

I'd like to see somebody make an automobile horn that would blow just as loudly

inside the car as outside. It would surely be educational!

FRANK VICTOR, Ph.D., New York, N. Y.

A Safety for a Sander

Following your plans for building an electric road sander [Nov., p. 230], I built a set for my car. Moreover, I added a safety feature that has worked very well and that others might like to adopt for their sanders.

Instead of the switch described in the article, I used a double-pole, double-throw switch with a center off. I hooked one set of terminals to the hot side of the ignition switch, for working the sander manually. I hooked the other set of terminals to a wire from the stop-light switch through the toggle switch to the sander. Thus, flipping the toggle switch one way works the sander manually; flipping it the other way causes the sander to work automatically when I apply the brakes. In center position, of course, it doesn't work at all.

I even found that by holding the brakes

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are *your* laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

McMORROW, BERMAN & DAVIDSON

Registered Patent Attorneys

PATENTS • COPYRIGHTS • PATENTS

142-Z VICTOR BUILDING, WASHINGTON 1, D. C.

STOP RUST

FROM MOVING IN WHEN ANTI-FREEZE IS DRAINED OUT!

WITH

PERMATEX

WATER PUMP LUBRICANT and RADIATOR ANTI-RUST

All types of permanent Anti-Freeze contain a rust inhibitor. When you drain your anti-freeze for warm weather driving and refill with clear water . . . look out—that's when the rust moves in . . . Prevent this rust from forming . . . protect your engine and water pump . . . add a can of Permatex Water Pump Lubricant and Radiator Anti-Rust. It keeps water crystal clear and lubricates the pump . . . stops squeaks and squeals, prevents wear.

Send for free illustrated catalog

LOOK FOR THE DISTINCTIVE PERMATEX LABEL

at your service station or garage. It's been your guarantee of quality for over 45 years.

OVER FIFTY CHEMICAL PRODUCTS FOR BETTER AUTOMOTIVE MAINTENANCE

PERMATEX COMPANY, INC., Brooklyn 35, New York

for a few seconds after my car had stopped at a stop light, I caused the sander to drop enough sand to start me up easily at icy intersections.

EUGENE J. GRENZ, Bismarck, N.D.

He Shoots Oil from the Hip

Every time my lawn mower squeaked, I used to run into the house, where I keep my oilcan. Now I carry a supply of oil in my hip pocket—in my son's discarded plastic

water pistol. I find it handles a lot of other outside oiling jobs, too.

ALBERT W. STEIN, St. Petersburg, Fla.

No Overdrive in GM Cars

Why hasn't it been possible to buy Chevrolets equipped with Overdrive during the past few years, when it has been available for Fords, Plymouths, etc.?

J. W. BOISSINOT, Middlebro, Manitoba

Because Overdrive is not just a name applied loosely to an optional fourth gear. It is a specific, patented product produced by the Warner Gear Division of the Borg-Warner Corp.

As a matter of company practice, none of the GM divisions buys transmission units outside the parent corporation.

Slight 1,200% Error

Mr. Johansen certainly rates bouquets for his interesting and skillfully written story, "TV Antennas Made Him Rich" [Feb., p. 117]. In an article so full of facts and figures, it was surprising to find only one slight error. The Channel Master Corp. in 1953 used 5,000,000 pounds of aluminum, not 400,000 pounds, as was stated. The 400,000-pounds figure represented the monthly consumption.

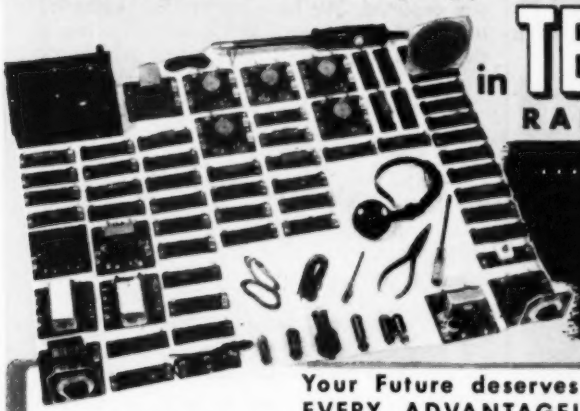
HAROLD HARRIS
Channel Master Corp., Ellenville, N. Y.

No Sooner Said Than Done

One of your readers recently indicated that he would "like to see them make" an electrically heated windshield scraper [Jan.,

NOW.. get laboratory-type training AT HOME!

in TELEVISION RADIO-ELECTRONICS



...thanks to D.T.I.'s practical HOME LABORATORY

THE D.T.I. HOME LABORATORY is a remarkable development that enables you to get PRACTICAL experience in Television-Radio-Electronics *right in your own home*—much the same type of practical, basic training that might be expected from attending a well equipped training laboratory.

300

Over a period of time you get and KEEP 16 shipments of Radio-Electronic parts for working over 300 "Learn By Doing" projects and experiments. First you mount your parts on individual fiber bases with spring clip connectors. Simply push down connector . . . insert wire . . . release . . . and you have a good connection. By means of this flexible system, you speedily rearrange your parts into many different circuits—saving hours of time. Wonderful for experimenting.

You build and operate six different types of Radio circuits...Television circuits...a wireless microphone...continuity testers... and many other major projects. We have found nothing else like it for getting practical circuit knowledge at home.

LEFT: Student arranging his D. T. I. parts into 6 tube "Super" Radio Circuit. This is but one of the many major circuits you build ...and operate. You will find D. T. I.'s system unsurpassed for speedy circuit construction and experimenting.

MODERN LABORATORY

If preferred, you can get all of your preparation in our modern Chicago Training Laboratory—one of the finest of its kind. Ample instructors, modern equipment. Write for details!

MILITARY SERVICE

If subject to military service, the training information we have for you should prove very helpful.

Your Future deserves EVERY ADVANTAGE!

What will mailing the coupon below do for YOU? Just this! You'll find out about one of today's most practical ways to prepare to get into America's great billion dollar opportunity field of TELEVISION-RADIO-ELECTRONICS—a way that has already enabled thousands of men to get started toward a bright future in Television. You'll see how you may get into interesting work that pays well . . . that offers one of today's most promising futures . . . that enables you to start your own TV-Radio service business on little capital, if you prefer this to a job opportunity.

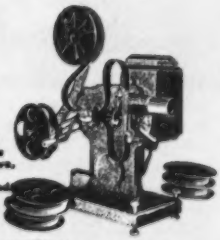
And above all, you'll see that it's no longer necessary to leave home to get the kind of practical, laboratory type training so desirable for making real progress in this fast-growing opportunity field. You get home training that has the full benefit of the knowledge and experience gained from training thousands of students first hand in Chicago. You get (1) well-illustrated lessons, (2) D.T.I.'s wonderfully effective Home Laboratory as described to the left—which also includes building and keeping a commercial-type 5-inch Oscilloscope and jewel-bearing Multi-Meter, and (3) D.T.I.'s amazingly effective and exclusive home training aid—INSTRUCTIVE MOVIES. But why not get the complete story? Mail the coupon today.

RIGHT: As part of many interesting home laboratory projects, you build and keep this high quality, commercial-type 5-INCH OSCILLOSCOPE. This valuable test instrument—almost a "must" for efficient Television Servicing—is an important reason why so many D.T.I. men are able to EARN WHILE THEY LEARN.

LEFT: You also build and keep this valuable jewel-bearing . . . self-powered MULTI-METER—one of the handiest ALL-PURPOSE meters you can own. It will also prove a valuable aid in helping you earn while a student, and later when working full time in the field.

16-mm. MOVIES

You see this 16-mm. motion picture projector and many reels of educational film—a wonderful, exclusive, D.T.I. home aid to help you understand important fundamentals faster . . . easier . . . better. It's almost like having a teacher in your home.



ACT NOW!

Mail coupon today for complete facts—including valuable publication that shows 89 Ways Money To Earn In Television-Radio-Electronics.

89 WAYS TO EARN MONEY IN TELEVISION RADIO ELECTRONICS

"ONE OF AMERICA'S FOREMOST TELEVISION TRAINING CENTERS"

DeVRY TECHNICAL INSTITUTE
AFFILIATED WITH
DeFOREST'S TRAINING, INC.
CHICAGO 41, ILLINOIS

DeVRY TECHNICAL INSTITUTE
4141 BELMONT AVE., CHICAGO 41, ILL. Dept. PS-4-K

I would like your Opportunity News Bulletin showing "89 Ways to Earn Money in Television-Radio-Electronics"; also, complete facts about the training opportunity made possible by your organization.

Name_____ Age____

Address_____ Apt.____

City_____ Zone____ State_____

There's no limit to the number of money-saving jobs you can do with a Weller Soldering Gun. It's the fastest, handiest soldering tool yet developed. In fact you can complete soldering and mending jobs—before an ordinary tool warms up! Light weight and perfect balance for easy handling. Streamlined for tight places. Does a professional job—over 600,000 in use by radio and TV repairmen, auto mechanics, and electricians. Write for catalog and ask your hardware dealer for a demonstration.

INSTANT HEAT—saves time and current
FULL CONSTANT HEAT—250 watts
TWIN SPOTLITES—light up work area
SPECIAL TIPS—for cutting, smoothing
TRIGGER-SWITCH CONTROL—instantly on, instantly off

Weller **SOLDERING GUNS**

806 Packer St., Easton, Pa.

AT BETTER HARDWARE STORES EVERYWHERE

p. 159]. Two years ago I applied for a patent on a scraper very similar to the one you depicted. We have just started production on them this year and have sold a few thousand already.

JAMES D. CLEMENTS
Mosey Tool Co., Richmond, Ind.

Nash Rambler's Carrier Top

I would like to point out that the carrier top that you referred to as "optional" for the new Nash Rambler four-door station wagon [Feb., p. 135] is actually standard equipment on that model.

JOHN R. PICHURSKI
Nash Motors, Detroit, Mich.

Keeps Car Facts on Cards

I thought that you, as well as other readers, might like to know that along with your "Information File" cards, I save the "Facts on Cars." I noticed that they fit on a 3-by-5 card nicely with a little snipping, and I started my file back in 1951. It comes in handy when someone asks me

for information on a certain car of a certain year.

ROBERT WEINFELD, Bronx, N.Y.

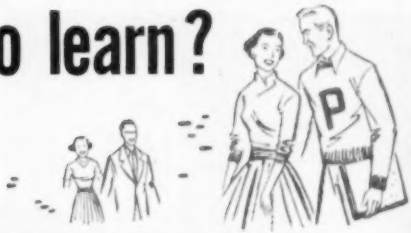
A Short History of Hardtops

At the end of your article on the new Mercury [Jan., p. 138], you said hardtops were introduced in 1950. I think I have seen 1949 Buick Roadmaster hardtops, and I have heard of one made by Chrysler around 1946.

ROBERT M. FLEMING JR., *Pittsburgh, Pa.*

Right you are—on both counts. Buick did bring out a Roadmaster hardtop in July, 1949. And 'way back in 1946 Chrysler offered a "Custom Club Coupe" which was a true hardtop in that there was no center post and the rear quarter-window rolled down into the body just as it does in the convertible. Chrysler says that only a few were made because of the postwar rush to get as many standard models as possible to a car-hungry public.

Are you too old to learn?



not at all, new tests show!

EXPERT SAYS YOU CAN LEARN NEW TRICKS! New tests, cited by an expert in news stories, show that: your ability to think increases with age; your powers of deduction are greater; your judgment is better.

I. C. S. KNEW IT ALL THE TIME! In the I. C. S. files are thousands of case histories of men and women of every age. Their successes, their promotions, their raises prove that men and women past school age can learn! Listen to A.L.G.* "Up until I took the course, I did what I was told. But now . . . I tell others what to do."

I. C. S. GIVES YOU EXPERT GUIDANCE FREE! Do you have the feeling you're "stuck" in your job? Your trained I. C. S. counselor will appraise your abilities, help you plan for the future. Listen to D.F.K.* "Before enrolling, I was a foundry laborer. Today I am a draftsman, enjoying a ⅓ increase in salary."

IT'S NEVER TOO LATE TO GET STARTED! You study with I. C. S. at home, in your spare time. There's no interference with business or social activity. Famous I. C. S. texts make learning easy. And whatever your age, you're more capable now than you've ever been. But don't delay! Pick your field from the coupon below. Mail the coupon today! We'll send free "success" book, survey of opportunities in your field! *Mail now for 2 free books.*

*Names on request

For Real Job Security—Get I.C.S. Training! **I.C.S., Scranton 9, Penna.**

INTERNATIONAL CORRESPONDENCE SCHOOLS ICS

BOX 7677-N, SCRANTON 9, PENNA.

Without cost or obligation, send me "HOW to SUCCEED" and the booklet about the course BEFORE which I have marked X:

ART
- ☐ Commercial Art
- ☐ Magazine Illustrating
- ☐ Fashion Illustrating
- ☐ Cartooning
- ☐ Sketching and Painting
- ☐ Show Card and Sign Lettering

AUTOMOTIVE
- ☐ Automobile, Mechanic
- ☐ Auto Elec. Technician
- ☐ Auto Body Rebuilding and Refinishing
- ☐ Diesel—Gas Engines

AVIATION
- ☐ Aeronautical Engineering Jr.
- ☐ Aircraft Engine Mechanic
- ☐ Airplane Drafting

BUILDING
- ☐ Architecture
- ☐ Arch. Drafting
- ☐ Building Contractor
- ☐ Estimating
- ☐ Carpenter and Mill Work
- ☐ Carpenter Foreman
- ☐ Reading Blueprints
- ☐ House Planning
- ☐ Plumbing
- ☐ Heating
- ☐ Painting Contractor
- ☐ Air Conditioning
- ☐ Electrician

BUSINESS
- ☐ Business Administration
- ☐ Certified Public Accountant
- ☐ Bookkeeping and Accounting
- ☐ Office Management
- ☐ Stenography and Typing
- ☐ Secretarial
- ☐ Federal Tax
- ☐ Business Correspondence
- ☐ Letter-writing Improvement
- ☐ Personnel and Labor Relations
- ☐ Advertising
- ☐ Retail Business Management
- ☐ Managing Small Business
- ☐ Ocean Navigation
- ☐ Sales Management
- ☐ Short Story Writing
- ☐ Creative Salesmanship
- ☐ Traffic Management

CHEMISTRY
- ☐ Chemical Engineering
- ☐ Chemistry
- ☐ Analytical Chemistry
- ☐ Petroleum—Nat'l Gas
- ☐ Pulp and Paper Making
- ☐ Plastics

CIVIL, STRUCTURAL ENGINEERING
- ☐ Civil Engineering
- ☐ Structural Engineering
- ☐ Surveying and Mapping
- ☐ Structural Drafting
- ☐ Highway Engineering
- ☐ Reading Blueprints
- ☐ Construction Engineering
- ☐ Sanitary Engineering

DRAFTING
- ☐ Aircraft Drafting
- ☐ Architectural Drafting
- ☐ Electrical Drafting
- ☐ Mechanical Drafting
- ☐ Structural Drafting
- ☐ Sheet Metal Drafting
- ☐ Ship Drafting
- ☐ Mine Surveying and Drafting

ELECTRICAL
- ☐ Electrical Engineering
- ☐ Electrician
- ☐ Electrical Maintenance
- ☐ Electrical Drafting
- ☐ Electric Power and Light
- ☐ Lineman

HIGH SCHOOL
- ☐ High School Subjects
- ☐ Mathematics
- ☐ Commercial
- ☐ Good English

MECHANICAL AND SHOP
- ☐ Mechanical Engineering
- ☐ Industrial Engineering
- ☐ Industrial Supervision
- ☐ Foremanship
- ☐ Mechanical Drafting
- ☐ Machine Design-Drafting
- ☐ Machine Shop Practice
- ☐ Tool Design
- ☐ Industrial Instrumentation
- ☐ Machine Shop Inspection
- ☐ Reading Blueprints
- ☐ Toolmaking
- ☐ Gas—Electric Welding
- ☐ Heat Treatment—Metallurgy
- ☐ Sheet Metal Work
- ☐ Sheet Metal Pattern Drafting
- ☐ Refrigeration

POWER
- ☐ Combustion Engineering
- ☐ Diesel—Electric
- ☐ Electric Light and Power
- ☐ Stationary Steam Engineering
- ☐ Stationary Fireman

RADIO, TELEVISION COMMUNICATIONS
- ☐ Practical Radio—TV Eng'r'ing
- ☐ Radio Operating
- ☐ Radio and TV Servicing
- ☐ Television—Technician
- ☐ Electronics
- ☐ Telephone Work

RAILROAD
- ☐ Locomotive Engineer
- ☐ Diesel Locomotive
- ☐ Air Brakes ☐ Car Inspector
- ☐ Railroad Administration

TEXTILE
- ☐ Textile Engineering
- ☐ Cotton, Rayon, Woolen Mfg.
- ☐ Carding and Spinning
- ☐ Warping and Weaving
- ☐ Loom Fixing ☐ Throwing
- ☐ Finishing and Dyeing
- ☐ Textile Designing

Name_____ Age_____ Home Address_____

City_____ Zone_____ State_____ Working Hours_____ A.M. to P.M._____

Occupation_____

Canadian residents send coupon to International Correspondence Schools Canadian, Ltd., Montreal, Canada. . . . Special tuition rates to members of the U. S. Armed Forces.

LOW COST WOOD PANELS GUARANTEED FOR LIFE!

Beautiful Weldwood Plankweld®—easy to install—see it at your lumber dealer's now!

DO IT YOURSELF Plankweld is genuine wood wall paneling, factory prefinished to soft deep lustre. Ready for immediate installation; each package contains special metal clips which are nailed to wall to hold panels in place. Panels are edge grooved and overlap to conceal clips and nailheads. If you can hit a nail or saw a piece of wood you can install Plankweld easily. Can be installed on any nail-holding wall or directly to studs without furring. *Plankweld is guaranteed for the life of your home!*

CHOOSE THE WOOD YOU WANT. 16¼" x 8' Plankweld panels come prepackaged (108⅓ sq. ft. to package) and are available in birch, Philippine or Honduras mahogany, plain sliced oak, and walnut, ¼" thick. Now you can have a beautifully paneled wall for less than you think. See them all at your lumber dealer's or at any one of the 60 United States Plywood or U.S.-Mengel Plywoods showrooms located in principal cities, or write for complete information.

Weldwood®

Plankweld Paneling

UNITED STATES PLYWOOD CORPORATION

World's Largest Plywood Organization

Weldwood Building, 55 W. 44th St., New York 36, N.Y. and

U. S.-MENGEL PLYWOODS, INC., Louisville, Kentucky

Headlights of Future to Be 10 Times Brighter, Non-Blinding

HEAD LAMPS producing 10 times as much light as today's, yet without blinding approaching drivers, are predicted for cars of the future. Other developments foreseen by Val J. Roper, GE illuminating engineer, are:

- Fluorescent lamps to light the luggage compartment and the engine;
- Infrared lamps to keep windshields free of ice, snow and condensation;
- Instrument panels lighted by electroluminescence;
- Fluorescent lamps, recessed in the bottoms of all doors, that light automatically when the doors are opened;
- "Black light" to illuminate fluorescent knobs on switches and other controls;
- A swivel-type dome spotlight to supply a concentrated beam of light which will not annoy the driver;
- Indicator lamps that light up to show trouble in the form of a burned-out head lamp, low oil pressure, high water temperature, low oil level in the crankcase, low water level in the battery;
- Turn signal and stop lamps brighter by day in order to be more readily visible in bright sunlight;
- Tubular fluorescent sources to mark all four corners of the car, red in the rear and amber in front;
- A small light on the left front door that will shine a white light downward to illuminate the keyhole, a white light to the front and a red light to the rear to serve as parking lights.

The problem of getting more light with less glare from head lamps will be solved by polarization. The lamps themselves Roper sees as gaseous-discharge types, similar to mercury lamps today, rather than incandescent bulbs.

They will operate at a relatively high pressure and high temperature, and will be several times as efficient as current tungsten-filament types. They will be somewhat larger than present head lamps, and will be of higher wattage. Their lenses will be polarized.

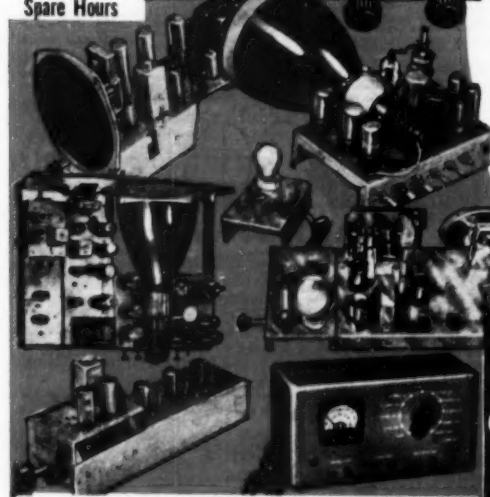
So that motorists will not be blinded by approaching "searchlights," windshields also will be polarized, but at night only. The flick of a switch will remove the polarization for driving on well-lighted highways and streets, and for driving in the daytime.

I'll Train YOU at Home in Your Spare Hours for Big Pay Job • Your Own Business • Exceptional Opportunity in

RADIO-TELEVISION

ON *New* NO-OBLIGATION PLAN!

Train At Home In Spare Hours



IF YOU ARE EXPERIENCED IN RADIO Men already in Radio who seek a short intensive 100% TELEVISION Training with FULL EQUIPMENT INCLUDED are invited to check and mail the coupon at the right.

You Have NO MONTHLY PAYMENT CONTRACT

to sign... you pay for your training as you learn and earn... ENROLL NOW!

Be Ready in Little as 10 MONTHS!

Now you can get into Radio-Television, today's fastest growing big money opportunity field, in months instead of years! My completely new "package unit" training plan prepares you to qualify as a Radio-Television Technician in as short a time as 10 months, or even less! I offer you my training with no monthly payment contract to sign—thus NO RISK and NO OBLIGATION for you! This is America's finest, most modern and really practical training. Includes FM . . UHF Television and all the most recent developments. My training gets you ready to handle any practical job in the booming Radio-Television industry. Start your own profitable Radio-Television Service Shop . . . or accept a fine paying job. I have trained hundreds of successful Radio-Television technicians—and I can train you regardless of lack of previous experience. Mail coupon and get all the facts—FREE!

VALUABLE EQUIPMENT INCLUDED WITH TRAINING

Much of your Sprayberry Training is actual construction, demonstration and experimentation. You get priceless practical experience this way. You build the 6 tube Sprayberry Short Wave and Broadcast Training Radio Receiver, the Sprayberry Television set, multi-range test meter, signal generator, signal tracer, cathode ray oscilloscope and many other projects. All this equipment is yours to keep. You have practically everything you need to set up your own profitable Radio-Television shop. All lessons and books I send you remain your own property.

OUR 21st YEAR TRAINING MEN FOR RADIO-TELEVISION

Earn Extra Money While You Learn

All your Sprayberry Training is given IN YOUR OWN HOME during your free time. Keep on with your present job and income while learning Radio-Television. With each Sprayberry "Package Training Unit" I include money-making plans and special "Business Builders" for spare time Radio-Television service jobs. New Television stations opening everywhere open big money opportunity for men to install UHF antennas—I tell you how! If you expect to be in the Armed Forces later, there is no better preparation than Radio-Television. Mail coupon below . . . get facts FREE. *No salesman will call.*

FREE TO YOU 3 BIG RADIO-TELEVISION BOOKS

I invite you to get all the facts—

I want you to have ALL the facts—without cost! Rush coupon for my three big Radio-Television books! "How to Make Money in Radio-Television" PLUS my new Illustrated Television Bulletin PLUS an actual sample Sprayberry Lesson—ALL FREE. No obligation and no salesman will call. Mail coupon!

SPRAYBERRY ACADEMY OF RADIO
Dept. 55-H, 111 North Canal Street
Chicago 6, Illinois

Mail Coupon Today!

NO OBLIGATION
No Salesman Will Call

SPRAYBERRY ACADEMY OF RADIO
Dept. 55-H, 111 N. Canal St., Chicago 6, Ill.

Please rush to me all information on your 10-MONTH Radio-Television Training Plan. I understand this does not obligate me and no salesman will call. Include 3 books FREE.

Name..... Age.....

Address.....

City..... Zone... State.....

☐ Are you Experienced? ☐ No Experience

HOW TO FIX ANY PART OF ANY CAR

QUICKLY--EASILY--RIGHT!

FREE 7-DAY TRIAL

WHETHER you're a beginner or an expert mechanic — now you can "breeze through" any "fix-it" job from simple carburetor adjustment to complete overhaul. Just look up job in index of MOTOR'S Brand-New 1954 Auto Repair Manual. Follow simple step-by-step directions, clear pictures. Presto—the job is done!

No guesswork! MOTOR'S MANUAL takes you from "scratch" — shows WHERE to start, WHAT tools to use. Covers EVERY job on EVERY car built *from 1940 thru 1954!*

Everything You Need to Know "Boiled Down" from 180 Official Shop Manuals

NEW, REVISED, ENLARGED, 1954 Edition contains the "meat" from over 180 OFFICIAL shop manuals — simplified for YOU. 35,000 essential repair specifications on over 800 car models. Over 850 big pages. More than 2500 "this-is-how" pictures. 225,000 service and repair facts. Leads beginners every step of the way. Time-saving factory repair procedures for experts. Instructions and pictures so clear you CAN'T go wrong. Used by U. S. Army and Navy.

Try Book FREE 7 Days

SEND NO MONEY! Pay postman nothing. Make Manual show you what it's got. Unless you agree this is the greatest time and work saver you've ever seen—return book in 7 days and pay nothing. Mail coupon today to: MOTOR — Book Dept., Desk 2D, 250 W. 55th St., New York 19, N. Y.

Covers 800 Models All These Makes

Buick	Lincoln
Cadillac	Mercury
Chevrolet	Nash
Chrysler	Nash
Crosley	Rambler
De Soto	Oldsmobile
Dodge	Packard
Ford	Plymouth
Frazer	Pontiac
Henry J	Studebaker
Hudson	Willys
Kaiser	

Same FREE Offer On MOTOR's Truck and Tractor Manual

Covers EVERY job on EVERY popular make gasoline truck, tractor made from 1939 thru 1953. FREE 7-Day Trial. Check proper box in coupon.

MAIL COUPON NOW FOR 7-DAY FREE TRIAL

MOTOR BOOK DEPT.
Desk 2D, 250 W. 55th St., New York 19, N. Y.
Rush to me at once (check box opposite book you want):

☐ **MOTOR's** *New* **AUTO REPAIR MANUAL.** If O.K., I will remit $1 in 7 days, $2 monthly for 2 months and a final payment of 50c (plus 35c delivery charges) one month after that. Otherwise I will return the book postpaid in 7 days. *(Foreign price, remit $3 cash with order.)*

☐ **MOTOR's** *New* **TRUCK & TRACTOR REPAIR MANUAL.** If O.K., I will remit $2 in 7 days, and $2 monthly for 3 months, plus 35c delivery charges with final payment. Otherwise I will return book postpaid in 7 days. *(Foreign price, remit $10 cash with order.)*

Print Name..... Age.....

Address .....

City..... State.....

☐ **Check box and save 35c delivery charge** by enclosing WITH coupon entire payment of $5.95 for Auto Repair Manual (or $8 for Truck & Tractor Repair Manual.) Same return-refund privilege.

Enjoy New Driving Comfort with the Sensational

AIR LIFT

PNEUMATIC SPRING BOOSTER

Front AIR LIFTS are specifically designed to give you new driving comfort. They dampen the suspensions, cushion the bumps and eliminate costly repairs.

You'll appreciate the ease with which you can drive the roughest roads and the severest turns with AIR LIFTS to steady your car.

For comfort, stability and safety install AIR LIFTS in your FRONT coil springs. To assist your rear springs . . . if you are carrying overloads . . . use REAR AIR LIFTS. Installation is simple . . . nothing to dismantle . . economical and guaranteed.

AIR LIFT

See Your Dealer Today or Write to:

AIR LIFT CO.
2330 W. Main Street
LANSING, MICHIGAN

30 POWER! WHISPER WEIGHT 8½ OUNCES

Newest Pocket Telescope engineered for UNITED to give you sharper, clearer, crisper images and smooth, easy-sliding focusing action. Use indoor, outdoor, vacationing, trips, close up and long distance viewing. 7 ins. closed, 14½ ins. extended.

NOT A CHEAPLY MADE TOY TELESCOPE. But a precision, all metal, chrome trimmed achromatic masterpiece. Interiors of VITAL front Achromatics are COATED assuring needle sharp viewing! Price includes handsome leather case. Made in Japan. UNCONDITIONALLY GUARANTEED. Try for 30 days. If not satisfied return for immediate refund. Cash orders postpaid. C.O.D.'s require $2.00 deposit.

$9.95 TAX FREE

UNITED BINOCULAR CO., 9043 S. Western Ave., Dept. ARF-9316, Chicago 20, Illinois **DEALERS WANTED**

SEE HOW EASY IT IS *Step by Step!*

BE AN ARTIST—*it's profitable*

It costs very little to enjoy our Art course at home. Commercial Art, Cartooning, Illustrating, Painting are all in one fascinating course; two art outfits are included, plus Life Class Book and handbook, "How to Sell Your Art Work." Free booklet explains artists' earnings, tested method of instruction, home study advantages. Low tuition, easy terms. No salesman will call. Send coupon today. Our 40 successful years are a mark of student confidence.

WASHINGTON SCHOOL OF ART, Studio 134N
Washington 5, D. C.

Send free book, "Art for Pleasure and Profit" to:

Name.....Age.....

Address.....

City, Zone, State.....

START YOUR FUTURE TODAY!

Get the facts on NATIONAL SCHOOLS' famous Shop-Method Home Training!

LEARN HOW YOU TOO CAN EARN TOP MONEY IN THESE BOOMING INDUSTRIES!

RADIO-TELEVISION & ELECTRONICS

A BRIGHT FUTURE awaits you in booming Radio-TV industry. More than 100 million radio sets, 20 million TV sets, now in use! Backed by National Schools' famous Shop-Method Training from America's Radio-TV Capital you can command good wages in the opportunity-career of your choice — engineer, service-repair, inspector, designer — in radar, electronics — or your own profitable business! Make that bright future come true . . . start now!

WE GIVE YOU COMPLETE PARTS, INCLUDING HIGH-MU TUBES! Yours to keep. You learn by doing, actually build generators, R-F oscillators, and this big Super-Het receiver!

WE GIVE YOU THIS STANDARD PROFESSIONAL MULTITESTER! Locates trouble, adjusts delicate circuits—a valuable profit-earner for you when you become a qualified Radio-TV technician!

LET NATIONAL SCHOOLS of Los Angeles, California, a Resident Technical Trade School for nearly half a century, train you at home for a high-paying future in these big-future industries.

Earn While You Learn!

Make extra money repairing friends' and neighbors' cars, trucks, radios, TV sets, appliances. Every step fully explained and illustrated in National Schools' famous "Shop-Tested" lessons. Latest equipment and techniques covered. You master all phases—start part-time earnings after a few weeks!

YOU RECEIVE FRIENDLY GUIDANCE, both as a student and graduate. Our special Welfare Department is always at your service, to help you with technical and personal problems. You receive full benefit of our wide industry contacts and experience.

DRAFT AGE? National Schools training helps you get the service branch, and higher pay grade you want.

APPROVED FOR G. I. TRAINING

AUTOMOTIVE-DIESEL & ALLIED MECHANICS

EXPANDING AUTO-DIESEL INDUSTRY needs more and more trained men! 55 million vehicles now operating, 6 million more this year—plus 150,000 new Diesel units! Garages, car dealers, transit lines, defense plants, manufacturers, are desperate for the kind of *trained specialists* produced by National Schools' "Shop-Method Home Training." Start *now* on the road to lifetime security. Mail the coupon today!

WE GIVE YOU THE TOOLS OF YOUR TRADE! This fully-equipped, all-metal Tool Kit is yours to keep. We also give you a complete set of precision drawing instruments, and Slide Rule. These professional tools help you learn, then *earn!*

NATIONAL SCHOOLS

Technical Trade Training Since 1905

LOS ANGELES 37, CALIFORNIA

In Canada: 811 West Hastings Street Vancouver, B.C.

Both Home Study and Resident Courses Offered

FREE! RADIO-TV BOOK & LESSON!

FREE! AUTO-DIESEL BOOK & LESSON!

MAIL COUPON NOW START YOUR HIGH-PAYING FUTURE TODAY!

GET FACTS FASTEST! MAIL TO OFFICE NEAREST YOU!

(mail in envelope or paste on postal card)

NATIONAL SCHOOLS, Dept. C-44

4000 S. Figueroa Street Los Angeles 37, Calif. or **323 West Polk Street Chicago 7, Ill.**

Please rush *Free* Book & Sample Lesson checked below. No obligation, no salesman will call.

☐ *"My Future in Radio-Television & Electronics"*

☐ *"My Future in Automotive-Diesel & Allied Mechanics"*

NAME _____ BIRTHDAY ____ 19 ____

ADDRESS _____

CITY _____ ZONE ____ STATE _____

☐ Check here if interested in Resident School Training at Los Angeles.

VETERANS: Give Date of Discharge _____

YOU can acquire

LAW NIGHTS AT HOME! LL. B. DEGREE

LaSalle's famous Law Library—used as reference in many Law libraries and Law offices—has enabled thousands to master Law surprisingly fast, in spare hours at home, for business and professional advancement.

These 14 remarkable volumes, compiled by leading professors and lawyers, cover the whole basic field of Law in condensed, orderly, simplified manner.

You advance rapidly with this great library, plus special lectures furnished. We guide you step-by-step with personalized Problem Method of instruction . . . you *learn by doing*—handling legal problems—not by memorizing rules.

Send for two FREE 48-page booklets, "Law Training for Leadership," and "Evidence," answering questions about Law and its value to you, and telling how LaSalle Law graduates are winning rapid advancement in business and public life. Mail coupon below. No obligation.

LA SALLE EXTENSION UNIVERSITY
A Correspondence Institution

417 S. Dearborn St. Dept. 483L Chicago 5, ILL.

Send me your two FREE booklets described above, without obligation.

Name.....*Age*.....

Street.....

City, Zone & State.....

Inventors

The following are the usual preliminary steps to take toward patent protection.

Make a disclosure of your invention; sign, date and have this document witnessed by two or more people who understand your invention; authorize your registered patent attorney or agent to conduct a preliminary search among previously granted U. S. patents for similar types of invention; secure a report on the probable patentability of your invention and a recommendation of the further course to take.

We shall be glad to send you without obligation our instructive booklet, "Patent Protection for Inventors" and our "Evidence of Invention" disclosure form.

VICTOR J. **EVANS & Co.** *Merlin M. Evans*
REGISTERED PATENT ATTORNEY
940-D MERLIN BUILDING, WASHINGTON 6, D. C.

INVENTORS

I shall be pleased to furnish you, upon request, with information relative to patent procedure—without any obligation on your part.

PATRICK D. BEAVERS
Registered Patent Attorney
937 Columbian Building, Washington 1, D. C.

PATENTS

C. A. SNOW & CO.
REGISTERED PATENT ATTORNEYS
WRITE FOR INFORMATION TO
426 SNOW BUILDING, WASHINGTON 1, D. C.

INVENTORS

Send for
PATENT INFORMATION
Book and
INVENTOR'S RECORD
without obligation
GUSTAVE MILLER
44-PS WARNER BUILDING
WASHINGTON 4, D.C.

REGISTERED PATENT ATTORNEY
ASSOCIATE EXAMINER
U.S. PAT. OFF. 1922-1929
Patent Attorney & Advisor
U. S. NAVY DEPT. 1930-1947
PATENT LAWYER

INVENTORS

Whether an invention is patentable can be substantially determined by a search of the U. S. Patent records. Without obligation, write for information explaining the steps you should take to secure a patent.

JOHN N. RANDOLPH
Registered Patent Attorney
205 Columbian Building Washington 1, D. C.

INVENTIONS For Sale

Our clients have excellent inventions in many fields to be manufactured and marketed on a cash, royalty or license basis. Full description of clients' inventions will be sent if you state your field of interest. INVENTORS: We also want inventions of every type. Write for details.

GLOBAL MARKETING SERVICE
1404 Mitchell Street Dept. PS Oakland 1, Calif.

When Writing To Advertisers

Please Mention Popular Science

INVENTORS

IF YOU WISH TO PROTECT YOUR INVENTION, You should take steps to protect it by a U. S. Patent. Write me for "INVENTION RECORD" FORM

CARL MILLER
REGISTERED PATENT ATTORNEY
WOOLWORTH BLDG., 35th FLOOR, 44C
NEW YORK CITY

NO EXPERIENCE NECESSARY!

LEARN TELEVISION AT HOME

IN YOUR SPARE TIME!

L. C. Lane, B.S., M.A.
President: Radio-Television Training Association
Executive Director: Pierce School of Radio & Television

VETERANS! CIVILIANS!

BE A SUCCESS AS A TRAINED TV TECHNICIAN!

Keep your present job while I prepare you AT HOME, using the same successful methods that have helped hundreds of men—many with no more than grammar school training—master television!

WARNING!

ALL VETERANS DISCHARGED BEFORE AUGUST 20, 1952 must be enrolled and IN TRAINING by August 20, 1954. Otherwise you lose your G.I. rights to a free education under NEW G.I. BILL! Don't put it off . . . it takes several months to get your papers processed! RUSH COUPON BELOW. Tell your ex-G.I. friends!

VETERANS!

MY SCHOOLS FULLY APPROVED TO TRAIN VETERANS UNDER NEW G.I. BILL! If discharged after June 27, 1950 —CHECK COUPON! Also approved for RESIDENT TRAINING in New York City . . . qualifies you for full subsistence allowance up to $160 per month.

ENOUGH EQUIPMENT TO SET UP YOUR HOME LABORATORY!

As part of your training, I give you ALL the equipment you need to prepare for a BETTER PAY TV job. You build and keep a professional GIANT SCREEN TV RECEIVER complete with big picture tube (designed and engineered to take any size up to 21-inch) . . . also a Super-Het Radio Receiver, RF Signal Generator, Combination Voltmeter-Ammeter-Ohmmeter, C-W Telephone Transmitter, Public Address System, AC-DC Power Supply. Everything supplied including all tubes.

EXPERT FM-TV TECHNICIAN TRAINING!

My FM-TV Technician Course can save you months of training if you have previous Armed Forces or civilian radio experience! Train at home with kits of parts, plus equipment to build BIG SCREEN TV RECEIVER, and FREE FCC Coaching Course! ALL FURNISHED AT NO EXTRA COST!

GOOD SPARE TIME EARNINGS!

Almost from the very start you can earn extra money *while learning*, repairing Radio-TV sets for friends and neighbors. Many of my students earn up to $25 a week . . . pay their entire training from spare time earnings . . . start their own profitable service business. *Act now! Mail coupon and find out for yourself what a TV career can do for you!*

NEW! PRACTICAL TV CAMERAMAN & STUDIO COURSE!

(For men with previous radio & TV training). I train you at home for an exciting big pay job as the man behind the TV camera. Work with TV stars in TV studios or "on location" at remote pick-ups! A special one-week course of practical work on TV studio equipment at Pierce School of Radio & TV, our associated resident school in New York City, is offered upon your graduation.

FREE FCC COACHING COURSE!

QUALIFIES YOU FOR HIGHER PAY! Given to all my students AT NO EXTRA COST after TV Theory and Practice is completed. Helps you qualify for the TOP JOBS in Radio-TV that demand an FCC License! Full training and preparation at home for your FCC License.

OPTIONAL: TWO WEEKS TRAINING IN NEW YORK CITY AT NO EXTRA COST

You get two weeks, 50 hours, of intensive Laboratory work on modern electronic equipment at our associated school in New York City—Pierce School of Radio and Television. And I give you all this AT NO EXTRA COST whatsoever, after you finish your home study training in the Radio-FM-TV technician course and FM-TV Technician Course.

RADIO-TELEVISION TRAINING ASSOCIATION
52 East 19th Street, New York 3, N. Y.
Licensed by the State of New York · Approved by the VA

MAIL COUPON TODAY!

MY 4 FREE AIDS SHOW YOU HOW AND WHERE TO GET A BETTER PAY JOB IN TELEVISION!
See for yourself how my simple, practical methods make success easy.

NO SALESMAN WILL CALL!

Mr. Leonard C. Lane, President
RADIO-TELEVISION TRAINING ASSOCIATION
52 East 19th St., New York 3, N. Y., Dept. P-4B

Dear Mr. Lane: Mail me your NEW FREE BOOK, FREE SAMPLE LESSON, and FREE aids that will show me how I can make BIG MONEY IN TELEVISION. I understand I am under no obligation and no salesman will call.

(PLEASE PRINT PLAINLY)

NAME _____ AGE _____

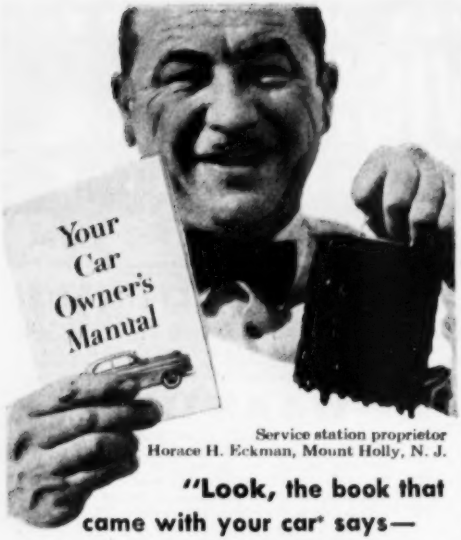
ADDRESS _____

CITY _____ ZONE ____ STATE _____

I AM INTERESTED IN:

- ☐ Radio-FM-TV Technician Course
- ☐ FM-TV Technician Course
- ☐ TV Cameraman & Studio Course

VETERANS! Check here for Training under NEW G.I. Bill ☐



Service station proprietor
Horace H. Eckman, Mount Holly, N. J.

"Look, the book that came with your car* says—

Change your Oil Filter every 5,000 miles"

***17 out of 18 leading car makers recommend oil filter changes at least every 5,000 miles, on the average, depending on car and driving conditions.**

Grit and sludge in the oil can ruin any engine . . . run up expensive repair bills. A regularly changed Purolator† Oil Filter traps them and keeps them from damaging delicate engine parts.

If you've driven 5,000 miles since changing your oil filter, it's probably clogged. Install a new Purolator Micronic† Refill—fast! Costs as little as $1.60. *More car makers specify Purolator than any other oil filter.*

† ® Purolator Products, Inc., Rahway, N.J., Toronto, Canada.

PurOlator

World's finest **OIL FILTER**

"There's a Purolator engineered for every make of car. We recommend them for all the cars we service."

Favorite of home owners and craftsmen for 20 years! SPEEDY SPRAYER gives your work that professional paint finish everyone admires. Sprays paint, enamel, varnish, lacquer, etc. . . . 4 to 7 times faster than hand brushing! Lightweight, portable, uses any ¼ H.P. motor. Improved diaphragm principle assures clean, oil-free air. You'll find dozens of time and money saving uses for SPEEDY SPRAYER, including spraying insecticides 2-4-D and DDT. Complete outfit, without motor, only $36.50

ONLY **$36.50** Less motor

At leading hardware, lumber, and auto supply dealers. **FREE**—*write for handy booklet "How to Spray."*

W. R. BROWN CORPORATION
2637 N. Normandy Ave. • Chicago 35, Ill.

LEARN TO MOUNT BIRDS

ANIMALS, FISH, PETS

Be a Taxidermist. Save your hunting TROPHIES. Have a fine home-museum. Hunters, save and **MOUNT** your beautiful DUCKS, QUAIL, DEER, **TAN** skins, FURS. **Great Fun.** Spare-time **PROFITS.**

FREE BOOK Tells ALL about it. 100 fine wild-game pictures, 48 pages. SEND TODAY, don't delay. Get this WONDERFUL **FREE BOOK,** MEN AND BOYS. Learn Taxidermy. Double your hunting pleasure. Rush letter or **POSTAL** today. **STATE YOUR AGE.**

N. W. SCHOOL OF TAXIDERMY, Dept. 2604. Omaha, Neb.

more jobs than graduates

Demand for our engineering graduates exceeds supply. *Effective placement!* Study in this world-famed college . . . established 1884. New term starts quarterly. Approved for Korean Vets.

ENGINEERS

engine opportunity! If you
g interesting work in these fi
pay you to write Box D
r, including a complete history
urse and education

Bach. Sc. degree in 27 months

Bachelor of Science in Mechanical, Civil, Electrical, Chemical, Aeronautical, Radio (Television), Administrative Engineering; Business Administration and Accounting. Also 36-weeks certificate courses in Surveying, Drafting, Secretarial Science. *Intensive program: technical fundamentals accented.*

Small classes: personalized instruction. For earnest, mature students whose time and budget require accelerated courses and *modest costs.* Preparatory courses.

Beautiful campus in friendly college town. Well-equipped, new and modernized buildings and labs. Enter June, Sept., Jan., March. *Write Jean McCarthy, Director of Admissions, for Catalog and View Book*

TRI-STATE COLLEGE
544 College Avenue Angola, Indiana

PUSHBUTTON MODEL 334

Here's a luxury car radio at a budget price! Five-station, push-to-lock pushbutton tuner. New larger speaker for new depth in tone. Low battery drain. $54.95.

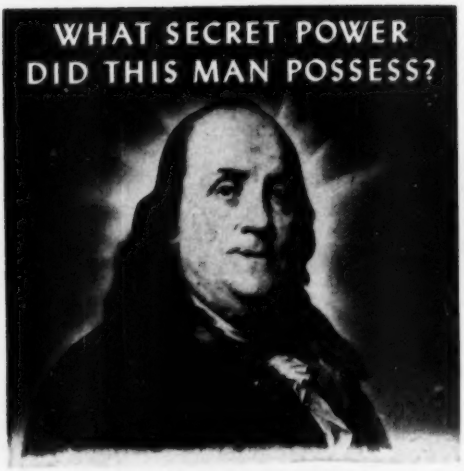
Powerful! Rich Superior Tone
Razor-Sharp Selectivity

Drive to your authorized Motorola dealer and get this spectacular radio buy! The powerful, top-performing Model 404 radio at the low, low price of $39.95! Rugged! Shock-resistant! Has five tubes plus rectifier and superheterodyne receiver. Automatic volume control reduces fading. Heavy-duty vibrator power supply for low battery drain. Hear it today—installed while you wait!

Better See the Motorola TV Hour on ABC-TV Tuesday nights in most cities

Better See Motorola Golden Voice Radio

WHAT SECRET POWER DID THIS MAN POSSESS?



BENJAMIN FRANKLIN
(A Rosicrucian)

WHY was this man great? How does anyone —man or woman—achieve greatness? Is it not by mastery of the powers within ourselves?

Know the mysterious world within you! Attune yourself to the wisdom of the ages! Grasp the inner power of your mind! Learn the secrets of a full and peaceful life!

Benjamin Franklin—like many other learned and great men and women—was a Rosicrucian. The Rosicrucians (NOT a religious organization) first came to America in 1694. Today, headquarters of the Rosicrucians send over seven million pieces of mail annually to all parts of the world. Write for YOUR FREE COPY of "The Mastery of Life"—TODAY. No obligation. No salesmen. A non-profit organization. Address: Scribe D.A.B.

THIS BOOK FREE!

The ROSICRUCIANS
SAN JOSE • (AMORC) • CALIFORNIA

SEND THIS COUPON

Scribe D.A.B.
The ROSICRUCIANS (AMORC)
San Jose, California

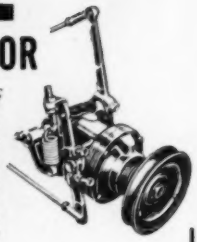
Please send me the *free* book, *The Mastery of Life*, which explains how I may learn to use my faculties and powers of mind.

Name_____

Address_____

City_____

this ONE GOVERNOR



ALL [illegible] gasoline engines

PIERCE LONG RANGE Universal Governor

ONLY **$39.50**

Pulley extra

Send Check or Money Order. State Make, Model of engine.

- Instant variable speed selection and accurate engine control at any speed setting within 1200 to 2200 RPM. Higher and lower ranges obtainable by simple change of pulley. Also "constant speed" operation.
- Accurate, dependable speed control for engines operating corn shellers, drag lines, hoists, arc welders, trucks and tractors with power take-offs, etc.

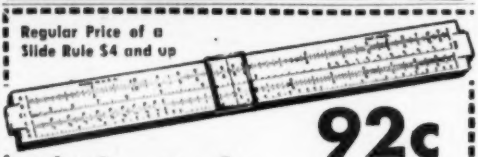
Write for Complete Information.

DEALERSHIPS AVAILABLE

"World's Most Experienced Governor Manufacturer"

THE PIERCE GOVERNOR CO., Inc.
1654 Ohio Avenue, Box 1000
Anderson, Indiana, U. S. A.

Regular Price of a Slide Rule $4 and up



92c and this coupon
Add 8c Postage

Slide Rule

If you can use a pencil you can use a slide rule

For bookkeepers, accountants, salesmen (figuring commissions, cost, etc.), farmers, housewives, etc. For Armed Forces highly important. Men's most useful tool. Easy to calculate instantly. Multiplying, proportions, division, roots, etc. "High Vision" Clear View Slide. Full 10" Rule. A, B, C, D, C1 and K scales.

FREE 28-page instruction book on how to get correct answers instantly without pencil or paper.

Gene Loewy, 545 5th Ave., Dept. 44-M, N.Y. 17

Limit three rules to each coupon

High School at Home

Many Finish in 2 Years

No classes. No time wasted going to and from school. Progress as fast as your time and abilities permit. Standard H. S. texts supplied. Thousands enroll each year in this 57-year-old school. Send for FREE descriptive booklet.

AMERICAN SCHOOL, Dept. H446
Drexel at 58th St., Chicago 37, Ill.
Without obligation, please send FREE descriptive booklet.

Name.....

Address.....

Fix ANY Car!

ANY make . . . ANY part . . . ANY model since 1940!

Here's The Help You Need . . . FROM THE WORLD'S BIGGEST AUTOMOTIVE PUBLISHERS!

Price only $5.95 . . . 2 months to pay!

There's a "secret" to fixing automobiles fast and easy . . . and this big 4¾-pound book is it!

Just look up the make, model and part you want to fix. The giant Chilton ALL CARS Manual tells you WHAT to do . . . SHOWS clear as A-B-C just how to do it.

With it, you can handle just about ANY job slick as a whistle—even tough jobs you may not have dreamed of tackling. You can find just what you need to know in a hurry. You work fast and r-i-g-h-t!

IT REALLY SHOWS YOU HOW!

Ask garage men! Ask leading school and U. S. Army and Navy instructors! Ask the thousands of beginners who got their start from previous editions of this manual!

They'll tell you the Chilton ALL CARS Manual is tops . . . BECAUSE it is so complete . . . BECAUSE it makes every step easy to understand.

Includes step-by-step service data on EVERY CAR made in the U.S.A. by 20 leading manufacturers from 1940 through June 1953 . . . over 1100 models in all. Contains approved data from 220 official shop manuals; 38,000 specifications; 350 Quick Check Data Tables and over 1800 big clear pictures that explain things at a glance.

BIG NEW EDITION!

Remember! Chilton Manuals come to you from the world's largest automotive publisher (MOTOR AGE and AUTOMOTIVE INDUSTRIES Magazines, the FLAT RATE BOOK, etc.). They're fully revised every year by 19 famous Chilton experts. These men work hand in hand with car makers . . . have full access to service data . . . even have their own big service shop! Best of all, they know how to write service manuals in a way you can really understand!

PRACTICE 10 DAYS FREE! Send coupon or write to: Chilton Co., 56th & Chestnut Sts., Philadelphia 39, Pa.

Covers every car made from 1940 through June 1953 of these makes:

BUICK	DE SOTO	HENRY J.	MERCURY	PLYMOUTH
CADILLAC	DODGE	HUDSON	NASH	PONTIAC
CHEVROLET	FORD	KAISER	OLDSMOBILE	STUDEBAKER
CHRYSLER	FRAZER	LINCOLN	PACKARD	WILLYS

FIX Fords!

FIX Chevrolets!

FIX Plymouths DODGES DESOTOS!

NOW!

SPECIAL LOW-COST MANUALS ON THE "BIG 3"!

Now you can get individual manuals on these three popular makes AT A BIG CASH SAVING! Each contains complete service data on EVERY MODEL of that make from 1940 to June 1953. Each has over 130 pages, hundreds of special photos, charts, diagrams, etc. Only $2.75 each. Check the one you want in coupon. 10-DAY MONEY-BACK GUARANTEE protects you fully!

Read what these users say!

"With my Chilton Manual, I did a job in an hour another fellow had worked on all day!"—*Gene Arnold, Iowa*

"You don't need a lot of previous training! Chilton makes every job easy to understand." — *Otto Morgenstern, Md.*

PRACTICE 10 DAYS FREE!

THE CHILTON CO., Dept. PS-44
56th & Chestnut Sts., Philadelphia 39, Pa.

Please send the following manuals (check the ones you want:)

☐ Send the big **CHILTON "ALL CARS" REPAIR MANUAL** (Price $5.95) for 10-day FREE EXAMINATION. If I like it, I will promptly remit $1.95 (plus 35c postage); then send $2 monthly for 2 months. Otherwise, I will return manual postpaid in 10 days and owe nothing.

Check here for special manuals
☐ Chilton **"CHEVROLET"** Manual, price $2.75
☐ Chilton **"FORD"** Manual, price $2.75
☐ Chilton **"PLYMOUTH-DODGE-DESOTO"** $2.75

NOTE: Above special manuals sold for ☐ cash with order (we pay postage). Or ☐ we ship C.O.D. and you pay postman for manual plus post office charges. Specify which method. Any manual returnable postpaid in 10 days and we guarantee to refund your $2.75.

(**OUTSIDE U.S.A.**—Cash only. "ALL CARS" Manual, $6.95. Special Manuals, $3.00 each. Same 10-day return privilege with money refunded.)

Name _____

Address _____

City, Zone, State _____

DRAFTSMEN

EARN BIG MONEY!

Want more money? Steady employment? Clean, interesting work? Look into Drafting. You'll quickly see why there's real opportunity, more money in this prosperous professional-type work. Want ads show trained draftsmen are in great demand. Find out how you can qualify in a few months for a good job in Drafting.

LEARN IN SPARE TIME—AT HOME
(or at the College in Chicago)

A few hours of pleasant home study every week —that's all. All the tools you need to train at home; valuable drawing outfit included. For 50 years this nationally famous school has prepared men quickly for good positions in industry.

FREE INFORMATION—SEND COUPON

Find out how C.T.C. practical training has boosted the pay for hundreds, what it can do for you. Learn what Chicago Tech graduates say about their work, earnings, success. Don't wait! Investigate now. Send for this FREE TRIAL LESSON. No charge for this lesson, now or later. Fill out and mail coupon or send post card today.

CHICAGO TECHNICAL COLLEGE

D-222 Tech Bldg., 2000 So. Michigan Ave.
Chicago 16, Illinois

Mail me FREE Lesson with information about big opportunities in DRAFTING.

NAME.....AGE.....

ADDRESS.....

CITY.....ZONE.....STATE.....

Spare-Time Income from Gardencrete

Wherever there's pride of home, there's a place for Gardencrete. That's why the sales field is so broad, and so rich in profit potentials.

Gardencrete is basically made of cement and sand, then Colorglazed in a choice of 30 attractive colors that stay new. Easily washed or scrubbed. Add beauty to every lawn and garden.

On a small investment for molds and Colorglazer you can develop a line of products that sell for two or three times your cost of materials and labor. Easily made in shed or garage. We supply full instructions.

Write for book "Make Money." Describes equipment and gives figures on costs and selling prices on dozens of different items.

Bird Baths
Jars and Vases
Flower Boxes
Flagstones
Lawn Seats
etc. etc.

Colorcrete Industries, Inc.
711 Ottawa Avenue, Holland, Mich.

The Bird Bath shown above, sells for $6.50. Cost of materials and labor, $2.25. Your mark-up, $4.25.

Telephones

DESK STAND STYLE
Slightly used and in excellent condition.
MANY VALUABLE USES—
Inter-house phones • Loud Speakers • Microphones • Educational purposes • Toys, etc.
$2.75 Postpaid in U.S.A.
Come Complete, ready to use
Wiring Diagrams Furnished
Two complete for only $5.00

TELEPHONE LAMP KITS
Including Telephone, harp, nipples, push switch, cord & plug together with illustrated instructions **$6.50 ppd.** (shade not included).

MICROPHONE Dept. X-904
1760 W. Lunt Ave., Chicago 26, Ill.

"How to Make Money with Simple Cartoons"

A book everyone who likes to draw should have. It is free; no obligation. Simply address FREE BOOK

CARTOONISTS' EXCHANGE
Dept. 194D, Pleasant Hill, Ohio

MEN! I'll Send You This $45.00 Set of SEAT COVERS FREE as a Bonus!

MAKE UP TO $16.50 A DAY CASH!

Take orders for sensational Auto Seat Covers, collect and keep a big ADVANCE CASH COMMISSION (up to $16.50 from a single order) . . . and I'll send you a $45.00 set of deluxe Seat Covers for your car FREE, **as an extra bonus** when orders are delivered! Show exclusive line of long-life easy-clean plastic materials and exciting new Key Auto Seat Covers to friends, neighbors, fellow-workers, others. Every car owner is a hot prospect because you offer superb tailoring, perfect fit for any car, amazing low prices.

FREE Money-Making Outfit! We send you absolutely everything you need, and it's all FREE TO YOU! SEND NO MONEY! Simply rush name and address TODAY, and I'll send big Seat Cover Sample Outfit, plus big-profit details and FREE Seat Cover Reward Offer.

KEY PRODUCTS CORP., Dept. 644, 800 N. Clark St., Chicago 10, Ill.

FREE

5-HP GRAVELY Makes Tough Jobs EASY!

Gravely does jobs other tractors won't . . . because Gravely has that *extra* power for tough mowing, gardening, field jobs. And you get *more* when you get Gravely: All-gear drive, power reverse, simple, easy operation, power attachments *securely* mounted, quickly interchanged by only four bolts!

PLUS . . . 21 JOB-RIGHT TOOLS!

Your choice of 21 tools . . . used with one versatile tractor that saves you time, work and worry *all year long*. "Power vs. Drudgery" booklet shows how Gravely solves your upkeep and gardening problems.

WRITE TODAY

GRAVELY TRACTORS, INC.
BOX 484 DUNBAR, W. VA.

USE THIS FREE KIT

MAKE UP TO $1000.00 a Month!

Everything You Need to Make Big Money with New "Midget Miracle" PRESTO Almost 2 MILLION Already Sold!

FREE—everything you need to cash in on this amazing new kind of fire extinguisher. Tiny "Presto" (about the size of a flashlight) does job of bulky extinguishers that cost **4 times** as much and are **8 times** as heavy. Ends fires fast as 2 seconds. Fits in palm of hand. Never corrodes. Guaranteed for 20 years! A tremendous money-making bargain—**sells for only $3.98!**

On this offer you get complete Sales Kit FREE. Everything you need to "wrap up" sales to civil defense workers, owners of homes, cars, boats, farms, etc. and to stores for re-sale—make big income. C. S. Mellous made $175 in just 5 days. M. R. Stanley $100 a day. C. Kama $1,000 a month. Write for your FREE Sales Kit. No risk. No obligation.

OVER $1,000 A MONTH

Charles Kama

"I'm making more than a $1,000.00 a month—and I haven't touched bottom yet."

Advertised in LIFE Magazine

MERLITE INDUSTRIES,
Dept. 114, 114 East 32nd St., New York 16, N. Y.

IN CANADA: Mopa Co., Ltd., 371 Dowd St., Montreal 1, P. Q. (If you want a regular Presto to use as a demonstrator, send only $2.50. Money back if you wish.)

RAISE RARE BIRDS FOR FUN & PROFIT

EARN BIG MONEY IN SPARE TIME

FASCINATING NEW HOME $$$ BUSINESS
Your chance of a lifetime! Cash in on America's fastest growing hobby-business. It's fun...It's easy. Breed—raise—train Parakeets, Exotic Cockatiels, Rare Tropicals, Gay Finches, Talking Birds, etc. Each pair produces up to 20 young every year!

$$$ IN YOUR OWN HOME! Birds take little space, make wonderful companions. A corner of any room will do. Breed all year 'round. Any climate! Feed costs only a few pennies a week! Takes only minutes a day.

BREEDING SECRETS REVEALED—Breed and raise rare birds with tested proven methods. Experts guide every step. Professional secrets revealed. You can't go wrong! Free expert consultation service.

HELP FILL THE HUGE DEMAND—Pet Shops, Breeders, hobbyists pay up to $1,000 per pair! Tremendous demand. We show you how your mailman can bring you more orders than you can fill!

FREE Send today for FREE success plan—plus details on how you can achieve financial independence.

Don't Delay
RUSH
Coupon Today

RARE BIRD BREEDERS GUILD
Box 1012, Goleta, California
Rush me your FREE success plan
Name _____
Address _____
City _____ Zone ____ State _____
(air mail reaches us overnight)

Amazing German Invention 'DISSOLVES' BEARDS Like Magic!

Conditions old or new blades to velvety smoothness

Get 30 Smooth Shaves from 1 Blade!

Here's great news for you fellows with tender skins! NOW shaving need not be a gruesome, painful task! This new marvel of German ingenuity helps prevent skin smarting and burning, nicks and scratches. Even tough beards seem to melt away. It's FUN to shave this HONIKRON way . . . your safety razor glides through the bristles—almost without effort! Best of all, you feel practically no pull, no scraping, no sensation of pain. It's unbelievable! You'll be feeling your skin . . . wondering whether the blade has actually given you this smooth, comfortable shave! You'll be astonished to discover that the stubble is all gone—that your skin feels like velvet! ALL THIS, too, in far less time than with old-fashioned shaving methods! (And your face FEELS GREAT, Mister!)

30 DAY FREE TRIAL

Make the 50/50 test in your own home at OUR risk! Shave half your face the old way. Use the HONIKRON way on the other half. SEE and FEEL the difference! DON'T THROW OUT THE OLD BLADE . . . use it over and over for 30 DAYS on one side of your face. Give it the HONIKRON treatment! Use NEW blades for the other side. THEN YOU BE THE JUDGE! See if the HONIKRON-CONDITIONED blade doesn't give you FASTER, SMOOTHER, CLOSER luxury shaves DAY AFTER DAY—right up to the 30th day—yes, better in every way than with the new blades!

NOW GET 30 TO 365 VELVET SHAVES FROM 1 BLADE!

HONIKRON soon pays for itself. 64 miniature abrasers hone and condition ANY double-edge blade—old or new—in a few seconds! It sharpens & smoothes BOTH sides, BOTH edges—all at once! And remember—whether your blade is old or brand new, by conditioning it the HONIKRON way you get smoother, better edges for closer, more velvety shaves—IN FAR LESS TIME! New blades often have a metallic fuzz that grinds into your skin; HONIKRON-ing removes this fuzz. Ever notice how one blade shaves better than another from the same pack? Don't blame your skin! Fast mass-production methods may cause variances you cannot SEE—but you can FEEL them! HONIKRON EQUALIZES and "barber-sharpens" ALL edges on any blade, new or used, giving you smooth shaving EVERY time.

SAVE MONEY!

New Deluxe model costs only 2.98—saves you many, many times its low original cost. It is so new, so sensational that many find it hard to believe in its super-efficiency. That's exactly why we want to send you one on a 30 DAY TRIAL. IT MUST give you the 30 best shaves of your life . . . it MUST thrill you in every way . . . it MUST save you time and money or your 2.98 comes back to you—no questions asked! Quantity limited. Please RUSH coupon today!

MOTO-MATIC CO., Dept. 7-D-3
352 Fourth Ave. New York 10, N. Y.

TRY 30 DAYS AT OUR RISK
Moto-Matic Company, Dept. 7-D-3
352 Fourth Ave., New York 10, N. Y.

RUSH a HONIKRON on 30 DAY FREE TRIAL. I must enjoy the best, smoothest luxury shaves of my life or you will refund my 2.98—no questions asked.

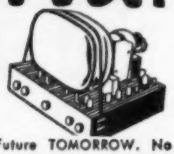
☐ Payment enclosed—send prepaid ☐ Send COD plus post

Name.....

Address.....

Town..... Zone..... State.....

BUILD your own TV Set



YES, actually build a valuable TV Set right at home. At the same time learn all about installing, repairing, servicing—and get ready for a Big-Pay Job in America's fastest-growing, most exciting industry. The CTI TV Train-at-Home Plan is preparing hundreds for bigger pay TODAY—and a brighter Future TOMORROW. No experience needed. We supply easy-to-understand instructions—made clear with hundreds of charts, diagrams, photos—plus TWENTY KITS of Parts, Professional Equipment and Tools Get a TV Set to ENJOY Get set to ENJOY a TV Future Make money in spare time while taking Course. THOUSANDS SUCCEEDING! So can You Send today for big FREE Book, "You Can Succeed in Television."

COMMERCIAL TRADES INSTITUTE
Dept. T1-4, 1400 Greenleaf Ave., Chicago 26, Ill.

A REAL SURE-FIRE SELLER!
THUGS AND THIEVES BEWARE!

Here is a tear gas pencil gun which discharges smothering clouds of tear gas to instantly stop, stun and incapacitate the most vicious man or beast. A safe and effective substitute for dangerous firearms. No permanent injury. Needed in Stores, Banks, Autos and Homes, everywhere to protect Life and Property. No skill required. Handle our tear gas as a side line and you'll soon give it full time. For a quick start send $4.25 for complete demonstrator outfit consisting of an Automatic Pencil Gun with 10 demonstrators and 3 powerful Tear Gas cartridges fully guaranteed. Many thousands now in use. Order your outfit today. Not sold to minors.

Hagen Supply Corp., Dept. PO4, St. Paul 4, Minn.

HOW TO SAVE MONEY ON *Home Repairs!*

NEW BOOK MAKES IT EASY!

Only $1.49

NOW you can save up to 50% on household repairs if you follow simple instructions in the big new illustrated book, *Tinkering With Tools!* Here you'll find everything you need to know about woodworking, shingling, plastering, interior and exterior painting, plumbing, wiring and masonry! In a jiffy you can learn how to repair faucets, valves and traps, electrical appliances, how to refinish floors and furniture, lay sidewalks, panel walls, renew sash cords, stipple walls—hundreds of home repairs so easy to make!

Never before have so many money-saving helps—plus hundreds of pictures—been packed into one big 260-page cloth-bound DeLuxe volume to sell for ONLY $1.49! A book this big should cost $3.50 or more!

SEND NO MONEY—ORDER TODAY

Mail your order now, and pay postman on delivery ONLY $1.49 plus shipping cost. If after 7 days' FREE TRIAL you aren't completely satisfied, return book and we'll gladly refund every cent. Write to:

POPULAR SCIENCE, Dept. 454
353 Fourth Avenue, New York 10, N. Y.

WHOLESALE!

$3.00 postpaid

FULL PRICE

KRUGER PISTOLS

.12 CALIBER SINGLE SHOT

FIRED BY .14 MG. GUNPOWDER CHARGE

Crafted after famous German Luger design

This is not an air or CO_2 gun. The Kruger is a small bore gun that actually shoots .12 caliber lead bullets fired by a .14 mg. powder charge. Beautifully designed—ideal for target shooting. It has a 4-inch steel barrel. Over-all length is 8¾ inches. This amazing low price is due to small bore gun design and direct factory- to-you sales.

The Kruger comes with 50 bullets. Extra bullets are available direct from us or at your local store.

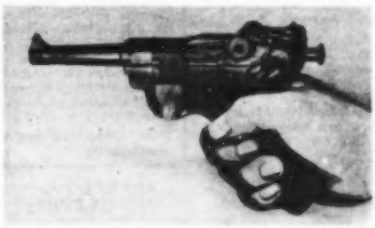
This offer is limited. Special Mail Order price of $3.00 each. YOUR MONEY BACK IF YOU ARE NOT COMPLETELY SATISFIED. Adults only. Send $3.00 in check, cash or money order. Prompt free delivery.

USE HANDY COUPON

KRUGER Corporation

2801 W. Valley Blvd., Alhambra, Calif.

Blue-black finish - Knurled Styrene Stock



KRUGER CORP., Dept. 64, Kruger Building,
2801 W. Valley Blvd., Alhambra, Calif.

Please send.....Kruger pistols at $3 each
Payment of $.....enclosed (Sorry, no COD's)

NAME.....

ADDRESS.....

CITY..... STATE.....

BECOME AN Electrical Engineer

- **Major in Electronics or Power**
- **Earn B. S. Degree in 36 months**

Over 50% of the nation's industrial leaders began their careers with engineering training. Today, the demand for young, trained Electrical Engineers and Technicians is constantly expanding. Eight separate programs give you a wide range of career opportunities.

Plan Your Career From these Courses in Electrical Technology

ENGINEERING COURSES
Electrical Engineering — Bachelor of Science Degree
Save a valuable year through optional year 'round study.
Electronics major ..... 36 months
Power major ..... 36 months

TECHNICIAN COURSES
Electro Technician ..... 12 months
Electronics Technician ..... 12 months
Radio Technician ..... 12 months
Radio and Television Technician ..... 18 months

SERVICE COURSES
Electrical Service ..... 6 months
Radio and Television Service ..... 12 months

Terms open July, September, January, April

Approved for veterans. Prior Military, Practical or Academic training evaluated for advanced credit. Faculty of specialists. 50,000 former students. Annual enrollment from 48 states and 23 overseas countries. 50th year. Non-profit.

MECHANICAL TECHNOLOGY COURSES — Also available, Service Technician courses 6 to 18 months — Heating, Refrigeration, Welding, Air Conditioning and Mechanical — Mechanical Engineering with a major in Design, Metal Fabrication or Plant Engineering.

Also, general 3-month preparatory course.

Send handy coupon for complete information.

MILWAUKEE SCHOOL OF ENGINEERING

MILWAUKEE SCHOOL OF ENGINEERING
Dept. PS454, 1025 N. Milwaukee St.
Milwaukee 1, Wisconsin

Please send me free booklet "Electrical Technology Field Bulletin." I am interested in ..... (name of course)

Name ..... Age .....
Address .....
City ..... Zone ..... State .....
If veteran, indicate date of discharge .....

NOW YOU CAN

MAKE MONEY

IN YOUR OWN SHOP WITH PLASTICS

Believe it or not you can make professional-looking plastic accessories right in your own home with average home shop equipment . . . even if you've never worked with plastics before.

As a pastime, or as a profitable venture, here's the way to open a whole new world of wondrous interest and enjoyment—with plastics. Write for this approved 72-page illustrated manual which covers cutting, machining, finishing, forming, joining, design, projects to make—a step-by-step complete basic course in working with plastics. . . . Put your time and your present home equipment to better use. Write *today* for your manual.

No C.O.D.'s, please $1.50 P.P.

PHIPPS & BIRD, Inc., P. O. Box 2V, Richmond 5, Va.

MONEY for MEN ALL DATA FREE

THE PLASTEX Industry needs manufacturers on small scale and for big production of Lamp and Clock Stands, Art Goods and Novelties in Plastex and Marble imitation. Experience unnecessary. 1½c material makes regular 10c store sellers. Rubber moulds furnished for speed production. Small investment brings good returns. We are now placing big chain store orders with manufacturers. Ambitious men have chance for real prosperity. Our Free booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept. Z, 3400 Third Ave., New York 56, N. Y.

ELECTROPLATE

ANY OBJECT IN HOME, SHOP, GARAGE OR START YOUR OWN WELL-PAYING ELECTROPLATING BUSINESS

TOOLS SILVERWARE HOUSEHOLD ARTICLES GUNS BABY SHOES AUTO PARTS & MANY OTHER ARTICLES

NOW, using **NEW** plating kit. It's easy to electroplate any object. Complete kit and instructions on plating metal and nonmetal objects, with nickel, copper, chrome, gold, etc., plus full data on obtaining all the business you desire and make **BIG MONEY** full or spare time. **ONLY** $5.95. **SEND NO MONEY**—everything sent **C.O.D.** plus postage—OR send $5.95 now and receive it postpaid. Money back in 7 days if not satisfied.

M. Z. NATIONAL SALES CO., 142-D Henry St., N. Y. 2, N. Y.

Watch Repairing Pays Big Money Learn at home

Watch repairers in great demand. Train step-by-step in 10 easy lessons. We furnish all tools and 15 jewel watch and practice movement. Turn spare time into cash. A licensed school. Low cost. Send for FREE book today.

ILLINOIS SCHOOL OF WATCH REPAIRING
2870 Elston Ave., Dept. PS-44, Chicago 18, Ill.

Two New How-To-Do-It Dollar Books Save Hundreds of Dollars on Home Repairs!

- New HOUSE WIRING GUIDE
- New PLUMBING GUIDE

PACKED WITH HUNDREDS OF PICTURES AND DETAILED DESCRIPTIONS

Planning to add new wall outlets, or install new electrical circuits to take care of heavier loads? Want to plan wiring for your new home . . . and actually wire it yourself? Trace defective wiring and make repairs? Get valuable 128-page *House Wiring Guide* that pictures and shows how to do it, step-by-step . . . save yourself hundreds of dollars!

Now! Add new plumbing, fix leaky pipes, cure clogged drains, service your shallow and deep wells and pumps, many other projects! Do it yourself and save big labor cost! Handy 128-page *Plumbing Guide* completely illustrates and describes every step clearly.

Get either book, only $1.00 prepaid—better yet, get *both* for $2.00—on an ironclad money-back guarantee. Mail your order TODAY!

FREDERICK J. DRAKE & CO., Dept. 344, Wilmette, Illinois

FREE BOOK—"How to Do a Good Paint Job." Send card (and name of your retailer, if you wish) to Baker Brush Co., Inc., 83 Grand St., New York City 13

Brushes by Baker

AMERICA'S FINEST PAINTING TOOLS

KIDNEYS MUST REMOVE EXCESS WASTE

Nagging backache, loss of pep and energy, headaches and dizziness may be due to slowdown of kidney function. Doctors say good kidney function is very important to good health. When some everyday condition, such as stress and strain, causes this important function to slow down, many folks suffer nagging backache—feel miserable. Minor bladder irritations due to cold or wrong diet may cause getting up nights or frequent passages.

Don't neglect your kidneys if these conditions bother you. Try Doan's Pills—a mild diuretic. Used successfully by millions for over 50 years. It's amazing how many times Doan's give happy relief from these discomforts—help the 15 miles of kidney tubes and filters flush out waste. Get Doan's Pills today!

FREE 10 U.S. STAMPS

COLORFUL set of 10 famous historic U. S. stamps—**all different**—sent FREE to secure names for our mailing list. Each stamp worth real money. We'll also send other interesting offers for your inspection, plus FREE copy of our helpful "How to Collect Stamps." Supply limited. Rush name, address and 10c to help cover actual postage and handling to:

LITTLETON STAMP CO., Dept. PS-4, Littleton, N. H.

BUILD 15 RADIOS

AT HOME WITH THE PROGRESSIVE RADIO "EDU-KIT"

ONLY $19.95 COMPLETE

All Parts, Instructions, Soldering Iron, Tester Included. Money Back Guarantee.

PROGRESSIVE "EDU-KITS" INC.
Dept. PS-516, 497 Union Ave., Bklyn. 11, N. Y.

PROGRESSIVE "EDU-KITS" INC.
Dept. PS-516, 497 Union Ave., Brooklyn 11, N. Y.
RUSH ME THE FOLLOWING:
☐ Free Descriptive Literature—No Obligation.
☐ Free Valuable Radio and TV Guides—No Obligation.

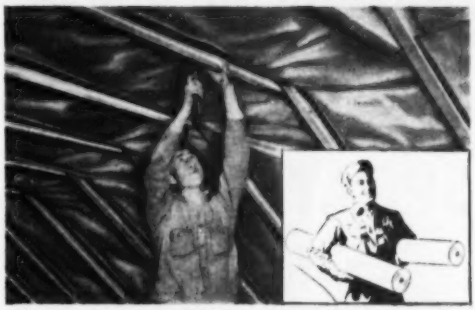
Name .....

Address .....

City ..... Zone .... State .....

Simplest, Lowest-Cost

RADIANT HEAT REFLECTOR!



Shut out Summer Heat, Save Winter Fuel—with

REYNOLDS ALUMINUM REFLECTIVE INSULATION

This low cost, readily installed aluminum foil bonded to tough kraft paper in walls or attic provides real insulation. Keeps winter heat in, summer heat out! Costs only about $40 over ceilings of average 6-room house! Clean, odorless, pliable. Perfect vapor barrier, fire-retardant. Readily tacked or stapled over ceilings, under rafters, between wall studs, under ground floors. Rolls 250 sq. ft., 25", 33", 36" wide. Makes great reflectors for radiators, photolights, etc. Mail coupon for *free samples.*

ALUMINUM GUTTERS

Easy to install, slip joints—no soldering. Non-staining. Cost much less than other rustproof materials.

Aluminum Nails. Rustproof, never stain, stay tight.

REYNOLDS *Do-It-Yourself* ALUMINUM

New kind of aluminum—easy to saw, drill, join, shape with ordinary woodworking tools.

At hardware and lumber supply dealers.

See your Building Supplies or Hardware Dealer

REYNOLDS *Lifetime* ALUMINUM BUILDING PRODUCTS

SEE "MISTER PEEPERS," starring Wally Cox, Sundays, NBC-TV.

MAIL THIS COUPON NOW!

Reynolds Metals Company
Building Products Division
2032 So. Ninth St., Louisville 1, Ky.
Send full information and FREE SAMPLES of Reflective Insulation. Also full details about
☐ Gutters & Downspouts ☐ Nails ☐ Flashing

Name _____

Address _____

City _____ State _____

NOW... SPRAY PAINT IT! CUT PAINTING TIME AND WORK 50%!

NEW, LOW-PRICED BURGESS *Electric* SPRAYER

with Long-Life Jeweled SAPPHIRE NOZZLE!

SPRAYS: Enamel • Lacquer • Glossy & Wall Paints • Varnish • Garden Sprays • Water • Insecticides

10-DAY FREE HOME TRIAL! Money-back Guarantee!

only **$12.95** complete with cord

Just Plug in Ordinary AC Outlet and Spray! Complete—Ready to Use No Extras to Buy!

Use the BURGESS ELECTRIC SPRAYER for hundreds of painting and spraying needs! Save countless dollars in time and labor. Do a "professional" job every time—effortlessly! BURGESS ELECTRIC SPRAYER paints floors, ceilings, walls, screens, fences, furniture—anything! Sprays flowers and shrubs, weed killer, too.

Look At These Features! Sprayer comes *complete*—ready to use! Equipped with new, Long-Life SAPPHIRE NOZZLE—same type of jewel used in fine watches. Sprayer lightweight—only 2½ lbs.! Sprays from any angle. Sliding spray adjuster regulates spray volume and pattern. Fast-action trigger switch. Absolutely safe!

GARDEN

INDOORS

OUTDOORS

FURNITURE

Hurry! Mail Coupon Now to Order Direct! 10-Day Free Home Trial!

BURGESS ELECTRIC SPRAYER is fool-proof, trouble-free. Get yours now. You need not send payment unless you care to. We ship C.O.D. plus small delivery charge if you prefer. You must be *100% Satisfied* or return sprayer within 10 days for full refund.

John H. Fair Co., Dept. 104, 180 N. Wabash Ave., Chicago, Ill.

Please send me a BURGESS ELECTRIC SPRAYER. On arrival I will pay postman $12.95, plus small delivery charge.

☐ $12.95 is enclosed in full payment. John H. Fair Co. will pay all delivery charges.

It is understood that whether I order C.O.D. or enclose remittance you guarantee satisfaction or money back upon return of sprayer within 10 days.

Name .....

Address .....

City ..... Zone ..... State .....

NEW! POLARVISION SAFETY LIGHT

A revolutionary new light discovery recently released for civilian use.

STOP HEADLIGHT GLARE

Fits All Cars & Trucks

FOR SAFETY AND COMFORTABLE DRIVING

The **Amazing** "Ergon Glass Lens" is an integral part of the Polarvision Light. It produces a **Black Light** (barely visible to the eye) which **Counteracts** oncoming headlights, street lights, etc. without interfering with your visibility. **Easy to Install** above windshield—beautiful accessory. Light encased in high grade chrome holder. Works off car's central lighting circuit. **Limited Supply. Complete** **$6.95** Guaranteed

Send cash, check, or money order.

Electronic Developments, Dept. CP-4, 10418 Venice Blvd., Culver City, Calif.

FUN TO DO . . . PROFITABLE TOO!

LEATHERCRAFT

Textile Painting • Shellcraft
Beadcraft • Metal Tooling
Lamp Shade Making
Other Crafts

Send for BIG, FREE Catalog Today!

Complete supplies, everything you need

KIT KRAFT, Dept 34 7373 Melrose Ave., Hollywood 46, Calif.

STOP RADIO & TV NOISES INSTANTLY!

NEW ELECTRONIC DESIGN

Bell-Tronic line filter eliminates noisy interference caused by motor appliances, autos, oil burners, etc. Simply plug radio or TV cord into filter and filter into wall socket. Send $1. Add 25c for P.P. & Handling. No C.O.D. Try 5 days. Money back guarantee. **$1.00**

TUBE WHOLESALERS CO.
Box 364, Dept. PS6, Rockville Centre, N. Y.

MAKE MONEY IN LANDSCAPING

Thorough training by Internationally known Landscape Architect to start your own business, improve your home or advance in this well paid field. Many opportunities.

Send for FREE BOOK

NATIONAL LANDSCAPE INSTITUTE
Dept. PS-4, 310 S. Robertson Blvd., Los Angeles 48

REAL ESTATE BE A BROKER

PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW! Graduates report making substantial incomes. Start and run your own business quickly. Men, women of all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, and related subjects. **STUDY AT HOME** or in classrooms in leading cities. Diploma awarded. Write TODAY for free book! No obligation.

FREE BOOK TELLS HOW

Approved for World War II and Korean Veterans

WEAVER SCHOOL OF REAL ESTATE (Est. 1936)
Suite 300 Law Bldg. Dept. PS Kansas City, Mo.

Motor coupling included

DRAINS cellars, laundry tubs; **FILLS** tanks; **CIRCULATES** oil; **IRRIGATES** gardens, fields.

1,001 USES—HOUSE, GARDEN, FARM

Original "Type P" All-Purpose Pump has 2400 GPH capacity, 360 GPH 75' high, or 1500 GPH from 25' well. Use any 1/6 to 3/4 HP motor. Oilless bearing. 1" inlet; ¾" outlet.

STAINLESS STEEL SHAFT. DOES NOT CLOG!

Postpaid if cash with order. (West of Miss. add 50c) MONEY BACK GUARANTEE.
Also larger Centrifugal Pumps and Gear Pumps in all sizes.

$6.95 LABAWCO PUMPS
BELLE MEAD 4, N. J.

DYNA-MITE POCKET RADIO

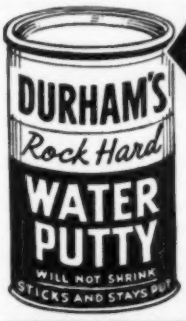
- Midget size real radio covers 540 to 1600 KC
- Up to 1100 miles night-time reception
- All parts fit within case
- Hearing aid battery powered
- Ideal for schools. Picture diagrams included

$5.99 postpaid

A POWERFUL ELECTRON TUBE RADIO designed to give you a personal set for office, home, or camp. Thousands now in use. Pre-fab kit quickly assembled. American-made, with PARTS, PERFORMANCE FULLY GUARANTEED. Hearing aid batteries INCLUDING EXTRA "A" BATTERY supplied at $1.50 per set. ALNICO-MAGNET powered 1500 ohm earphone only $1.45 when ordered with kit, or order flesh color 1900 ohm hearing aid earset, $4.95 C.O.D. ORDERS ACCEPTABLE with $1 deposit in U.S. & possessions.

NOTE: RADIO AVAILABLE FACTORY ASSEMBLED AT $8.95, PHONE AND BATTERIES EXTRA, AS ABOVE.

PRECISION ELECTRONICS, DEPT. 1
PLACERVILLE, CALIF.



The Modern PLASTIC for lasting Home Repairs

PERMANENTLY mends cracks or holes in wood, tile, stone or plaster. Sticks and stays put—Does not chip, shrink or fall out. Easy to use. Economical. Mold it, chisel it, polish or paint it. If unobtainable from your lumber, paint or hardware dealer, the big 4-lb. can will be sent you postpaid (in U.S.) for only $1.25. Full money-back guarantee, order now.

DONALD DURHAM CO.
Box 804-U, Des Moines, Iowa

BE A WELL-PAID TELEVISION SERVICE TECHNICIAN!

NOW—For the First Time an Exclusive TV Service Training Program—7 months' Shop Training Qualifies You.

Get the inside facts on how you can step into the top professional $5,000 to $10,000 per year bracket of TV servicing. Free book tells you how Master TV servicing QUICKLY by working on real live equipment right in our BIG SHOPS and LABORATORIES in America's Leading TV Servicing School. Shop trained men get the better jobs. WTI graduates win faster promotion . . . can demand better pay . . . develop highly profitable businesses of their own — with the latest and most complete PRACTICAL PERSONALIZED TRAINING BEHIND THEM. Non-essential math and engineering theory omitted. YOU CAN EARN WHILE YOU LEARN. LOW TUITION PLAN. Approved for Veterans. WTI Graduates in Big Demand. Send for your copy of this fact-packed book NOW!

SEND FOR **FREE** COPY TODAY!

WESTERN TELEVISION INSTITUTE Dept. M-4-4
341 W. 18th St., Los Angeles 15, Calif.
Without obligation, please send FREE fully illustrated booklet. (No salesman will call.)

NAME _____ AGE _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

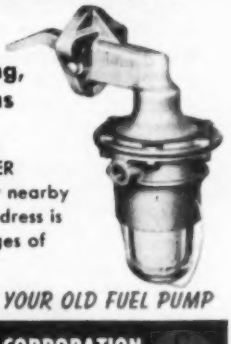
When You Need Your Car Most...

. . . when that important meeting is just minutes away, you can be sure of arriving on time when your car is running dependably.

You can depend on a

CARTER FUEL PUMP

POWER CENTER®



for trouble-free driving, in town as well as on the highway.

To give your car CARTER dependability, see your nearby CARTER dealer. His address is listed in the yellow pages of your phone book.

LIBERAL TRADE-IN ON YOUR OLD FUEL PUMP

CARTER CARBURETOR CORPORATION
St. Louis 7, Missouri
Division of American Car and Foundry Company

PREPARE FOR BETTER JOB, BIGGER PAY IN SPARE TIME AT HOME

Today, choose the job you want—and prepare for it in time you might otherwise waste. Or if you are already in the work you like best, start training now for quicker promotion and increased pay. During more than 50 years AMERICAN SCHOOL has helped ambitious people to reach higher goals. Check subject that interests you and mail coupon for full information.

AMERICAN SCHOOL, Dept. G446, Drexel at 58th, Chicago 37, Ill.
Without obligation, please send FREE and postpaid, full particulars about the subject checked below.

Accounting
Air Conditioning
Architecture & Building
Automotive Technician
Better Foremanship
Bookkeeping
Business Management
Cartooning
Diesel Technician

Drafting—Building Trades
Drafting—Machine Trades
Electrical Engineering
Electricity—Practical
Electronics—Industrial
High School Courses
Machine Shop Operations
Mathematics & Slide Rule
Mechanical Engineering

Plastics Engineering
Plumbing—Practical
Private Secretary
Refrigeration
Retail Merchandising
Salesmanship—Outside
Sheet Metal Work
Tool Making

NAME.....OCCUPATION.....
HOME ADDRESS.....AGE.....
CITY.....STATE.....

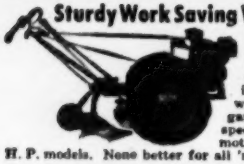
MAIL COUPON NOW

MORE FOR YOUR MONEY IN 1954

SHAW "DU-ALL"

Garden and Small Farm Tractors

Sturdy Work Saving Walking Tractor



Best buy in 1½, 2½, 3, 5 H. P. Handle 6, 8, 10 inch plows. All tools and attachments. Variable speeds, adjustable wheel widths, individual gang tool controls. Three speeds and reverse automotive gears on 3 and 5 H. P. models. None better for all 'round work.

New, Low Cost, Streamlined Riding Tractor

2½, 5, 8 H. P. Pull 8, 10, 12 inch plows. 28 inch tread, 56 inch wheel base. 3 speeds and reverse automotive gears. Individual brakes aid in short turning. ¾ to 7 M.P.H. Nothing else like it in a powerful, practical tractor at bed rock cost.

Inexpensive Tiller..Lawn Mower

Nine inch rotor pulverizes up to 12 inch swath 6 inches deep, or less. Extremely low cost. Rotor quickly replaced with single wheel for lawn mowing, hauling, etc.

See the Shaw Dealer

FREE CATALOG
Low Prices Return Mail. Write Today.

SHAW MANUFACTURING CO.
5704 Front St., Galesburg, Kansas
668-PS N. 4th St., Columbus, Ohio

SAVE MONEY

BUILD YOUR OWN CABIN, RANCH HOUSE or HIDEAWAY

For the Cost of Materials Alone!

Here's an amazing new book that shows you how to build your own cabin, lake cottage, modern ranch house, or mountain retreat at *lowest possible cost!* In all, you have 27 different, easy-to-follow plans to choose from.

SIMPLIFIED DETAILS

You don't need expensive professional help when you have *"How to Build Cabins and Ranch Houses"* at your side. This brand-new book gives you 256 pages of step-by-step instructions and hundreds of "show-how" illustrations to help you lay the foundation, build and caulk walls, construct stairs, lay floor boards, estimate costs. You'll find detailed plans that show you how to make windows, build fireplaces and chimneys, cut doors, install plumbing and lighting. You'll also learn how to prevent wood decay, build rustic furniture and lots more! It's truly a home builder's "dream book."

SEND NO MONEY NOW!

Detach and mail coupon below. When book arrives, pay postman the low, bargain price of only $2.49 (plus postage). Examine it for *a full week at our risk!* Then, if you don't agree you would ordinarily pay twice the price for such a big, jam-packed book, simply return it for prompt refund. But HURRY—get your copy while they last!

MAIL COUPON TODAY

POPULAR SCIENCE PUBL. CO., Dept. 454
353 Fourth Avenue, New York 10, N. Y.

Please send me a trial copy of *"How to Build Cabins and Ranch Houses"* today. I'll pay postman $2.49 (plus postage) on delivery. If not delighted, I may return book within 7 days for full refund.

Name.....
Address.....
City..... Zone..... State.....
☐ *Check here if you remit now. We pay postage. Same refund guarantee.*

SAVE THIS VALUABLE INFORMATION

BLUE-WHITE & **HARD** **GERMANY'S**

58 FACETS MAGA-LU-X

58 Facet Cut

BRILLIANT SYNTHETIC

(not a genuine diamond)

READ EVERY FINE PRINT WORD CAREFULLY

The **MAGA-LU-X's**, proud product of West German town over 2,000 years old, are **BLUE-WHITE, ±8 PLUS MOHS** SCALE **HARD** & 1.72 **BRILLIANT.** *Carefully Hand Cut & Polished.* Not an improved Titania or Zircon. **MX** scratches glass. Satisfied Executive Says *"Just a note that **** likes her Ring, received many compliments, wonderful job, thanks so much."* Engaged Man Writes *"Received Ring in time, very much pleased & everyone else was, also pleased with price. Thank You."* (unsolicited, many others on file.) **UNCONDITIONALLY GUARANTEED TO SATISFY** or **MONEY BACK. 30 DAY TRIAL. MX** comes in diamond paper with your name and registry number. Marquise, Square, Triangle, Emerald and 58 facet Round cuts. 1-12 carats. $15.00 per kt. Side pieces avail. **MAGA-LU-X-4** (highly selected—limited quan.) $20.00. **LADIES'** 14 kt. Tiffany type mounting $10.00. **MAN'S** Gypsy $22.50. $2.50 per piece setting charge 20% fed. tax. 35c shipping. Gift Boxed Gratis. Send Ring Size. Payment with order or C.O.D. 20% dep. **IMMEDIATE DELIVERY.** If Ever Defective—**FREE REPLACEMENT.** *Maga-lu-x's sold only by us!* **STARFIRE CORPORATION, Dep't. PS-7, 225 W. 34th St., N.Y.C. 1, N. Y.**

COMBINATION STETHOSCOPE

SURPLUS—*NEVER USED*

High Chrome Finish

$2.95 Postpaid

REGULARLY $12.00

A professional instrument for detecting delicate mechanism defects.

No C.O.D.'s. Send Check or Money Order to Dept. PS 5

JOB LOT TRADING 53 Vesey St. NYC

ENGINEERING DEGREE IN 27 MONTHS

Big Demand for Graduates

AERONAUTICAL, CHEMICAL, CIVIL, ELECTRICAL, MECHANICAL and RADIO EINGINEERING (inc. TV and Electronics).

Hundreds of young men are earning **B.S. ENGINEERING DEGREES** annually in this recognized institution—year around operation. New terms start quarterly. Many students earn a major part of their college expenses in this large industrial center.

Low tuition. Competent instruction. Thorough, intense, practical program. Modern, well-equipped laboratories including new physics laboratory and modern wind tunnel. Individualized instruction emphasized.

Gov't approved for G.I.'s. Engineering preparatory courses. Students from 48 states and 21 foreign countries. Enter June, September, December, March. Send coupon for free catalog and full information. Enroll now.

SEND COUPON TODAY

INDIANA TECHNICAL COLLEGE

644 E. Washington Boulevard
Fort Wayne 2, Indiana

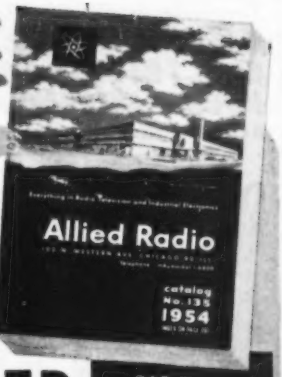
Please send me free information on B. S. Engineering degree in 27 months as checked.

☐ Aeronautical, ☐ Chemical, ☐ Civil,
☐ Electrical, ☐ Mechanical, ☐ Radio-Television.

Name.....

Address.....

FREE



SEND FOR THE

1954

ALLIED

268 value-packed pages

TV & RADIO CATALOG

WORLD'S MOST COMPLETE

Save on everything in TV and RADIO

Everything for Experimenters, Builders, Amateurs, Servicemen, Engineers and Soundmen

Send for ALLIED's big 268-page value-packed buying guide to *everything* in TV and Radio! Largest selections of custom TV chassis, TV accessories, FM and AM radios, High-Fidelity Sound, Amateur supplies, P.A. Systems, recorders, test instruments, builders' kits, industrial electronic supplies—plus the world's largest stocks of electronic parts, tubes, tools and books. Get *everything*—get more for your money—send today for your FREE 1954 ALLIED Catalog.

WORLD'S LARGEST STOCKS

NEW HOME OF ALLIED RADIO

ultra modern facilities TO SERVE YOU BEST

SEND FOR FREE CATALOG

ALLIED RADIO

ALLIED RADIO CORP., Dept. 7-D-4
100 N. Western Ave., Chicago 80, Illinois

☐ Rush FREE 1954 ALLIED 268-Page Catalog

*Name*_____

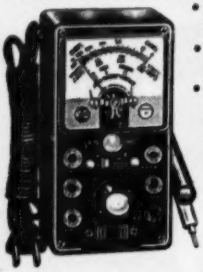
*Address*_____

*City*_____ *Zone*____ *State*____

The New Model 70 UTILITY TESTER

FOR REPAIRING ALL ELECTRICAL APPLIANCES MOTORS • AUTOMOBILES • TV TUBES

As an electrical trouble shooter the Model 70:



- Measures A.C. and D.C. Voltages, A.C. and D.C. Current, Resistances, Leakage, etc.
- Will measure current consumption while the appliance under test is in operation.
- Incorporates a sensitive direct-reading resistance range which will measure all resistances commonly used in electrical appliances, motors, etc.
- Leakage detecting circuit will indicate continuity from zero ohms to 5 megohms (5,000,000 ohms).
- Will test toasters, Irons, Broilers, Heating Pads, Clocks, Fans, Vacuum Cleaners, Refrigerators, Lamps, Fluorescents, Switches, Thermostats, etc.

As an Automotive Tester the Model 70 will test:

• Both 6 Volt and 12 Volt Storage Batteries • Generators • Starters • Distributors • Ignition Coils • Regulators • Relays • Circuit Breakers • Cigarette Lighters • Stop Lights • Condensers • Directional Signal Systems • All Lamps and Bulbs • Fuses • Heating Systems • Horns • Also will locate poor grounds, breaks in wiring, poor connections, etc.

• Will test all TV tubes for open filaments, inter-element shorts, burned out tubes, etc.

Handsome round-cornered molded bakelite case, 3¼"x5⅝"x2¼". Complete with all test leads. Also included is a 64 page book giving detailed instructions for testing all electrical appliances, automotive equipment, TV tubes, etc. Only **$15.85**

SHIPPED ON APPROVAL

NO MONEY WITH ORDER—NO C.O.D.

Try it for 10 days before you buy. If completely satisfied then send $3.85 and pay balance at rate of $4.00 per month for 3 months — No Interest or Carrying Charges Added. If not completely satisfied, return to us, no explanation necessary.

MOSS ELECTRONIC DIST. CO.
Dept. D-21, 3849 Tenth Ave., New York 34, N. Y.

Please rush 1 Model 70. I agree to pay $3.85 within 10 days after receipt and $4.00 per month thereafter.

Name_____

Address_____

City_____ Zone____ State_____

ACCORDIONS AT LOWEST WHOLESALE PRICES

5-DAY FREE TRIAL

"PAY AS YOU PLAY"
Small Down Payment As Little As $10 per month

DIRECT from Importer to You!

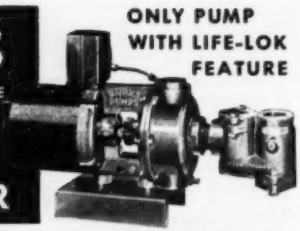
SATISFACTION GUARANTEED, or your money back! NOW you can save up to 50% by direct purchase from America's leading distributor of famous genuine ITALIAN ACCORDIONS. TRADE-INS ACCEPTED.

Send for FREE Illustrated Catalog!

ACCORDION MANUFACTURERS & WHOLESALERS OUTLET
2003 West Chicago Ave. Dept. P-44 Chicago 22, Ill.

BURKS SUPER TURBINE PUMPS LAST LONGER

ONLY PUMP WITH LIFE-LOK FEATURE

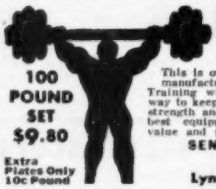


Thanks to the LIFE-LOK feature, the BURKS Super Turbine Water System lasts up to 40% longer than any other kind, delivers more gallons per minute and provides "like-new" performance and efficiency when other types would be worn out. It's completely automatic—self-priming.

FREE BOOK PICTURES PUMP DETAILS

Send today for "The Story of Burks"—a 32-page book giving detail drawings, graphs, etc. See why BURKS is finest engineered system . . . why it delivers more water per hour . . . why it's the finest water system you can buy. Write to—

DECATUR PUMP CO., 72 Elk St., Decatur 70, Ill.



100 POUND SET $9.80

Extra Plates Only 10c Pound

BARBELLS

140-Pound, **CHROME DELUXE** Barbell-Dumbbell set only **$16.80.** This is our feature set and is the finest ever manufactured.

Training with adjustable weight is the **BEST** way to keep fit; the **ONLY** way to develop great strength and a perfect body. As the oldest and best equipped barbell company, BUR gives value and prices no one can equal.

SEND FOR FREE CATALOG.
BUR BARBELL CO.
Lyndhurst 5, New Jersey

UPHOLSTERY
BE YOUR OWN BOSS

"Learn-by-Doing" at home—earn EXTRA CASH in spare time. Get a better job—be your own boss. UTS Course teaches professional Furniture Upholstery, re-upholstery, slipcovers, drapery making. No experience needed! **FREE**—tools, frames, materials to make 3 beautiful pieces upholstered furniture worth over $239.

Write for **FREE Illustrated Book. Upholstery Trades School, Dept. CD-1609, 721 Broadway, New York 3, N. Y.**

Broken or Loose FALSE PLATE?

Make Plates Like New

Fix it Yourself EASILY in a Few Minutes

Your plates may become broken or loose just when you need them most. With FIX-IT-KIT you can repair your own broken plates. Also tightens loose fitting plates, easily. Get permanent comfort with professional material. Complete instructions. Satisfaction guaranteed or your money refunded. *Order Now* at a new low price only **$2.98** postpaid — or sent C.O.D

DENT-FIX DENTAL PRODUCTS, Dept. PS-4
P.O. Box 674 Kansas City 8, Missouri

When Writing To Advertisers Please Mention Popular Science

GIANT BALLOONS

Surplus U.S. Gov't. (New—Overage) **NEOPRENE** Weather, target balloons. For **FUN** or **PROFIT.** Great sport in the backyard; or for parties, picnics, dances, fairs. **MONEY-MAKERS.** Use these balloons to attract crowds to civic events, conventions, exhibitions, trade shows. **TERRIFIC** for high school and college **PROMS.** All sizes are approx. inflated size. Postage prepaid on prepaid orders.

18", 3 for 55c
3 ft. dia. 49c—6 ft. dia. 99c
13 ft. dia. $1.59—20 ft. dia. $1.95

Calif. residents please add sales tax.

WAR ASSETS DIV. VOLUME SALES CO.
Dept. S-4-54, 3930 Sunset Blvd., Los Angeles 29, Calif.

IF YOU LIKE TO DRAW SKETCH OR PAINT...

You may have talent that could earn you $75 to $500 weekly! Trained artists are needed. See if your talent is worth training. Take the famous Art Talent Test, at home, alone, in spare time. Developed by world's greatest home study art school, it's helped thousands toward art careers. No fee or obligation. This coupon brings it. Write today!

ART INSTRUCTION, INC., STUDIO 4144
500 S. 4th St., Minneapolis 15, Minn.
Please send me your Free Talent Test. (Please print)

NAME _____
ADDRESS _____ PHONE _____
CITY _____ ZONE _____
COUNTY _____ STATE _____
OCCUPATION _____ AGE _____

To be Sure of the Genuine Demand This Trade Mark

Asbestos Gloves for HOT Jobs

Handle hot things with safety. Wear Industrial's famous 200-14 asbestos gloves. Made of 2½ lb. Underwriters Grade cloth that resists burning. Big roomy cut, airy and comfortable. One piece construction with no seams at wrist or working edges to burn or pull out. Furnished lined or unlined. Over 40 years experience in designing safety apparel made these dependable gloves. Many styles. Write for catalog.

INDUSTRIAL GLOVES COMPANY
A Corporation
1427 Garfield St., Danville, Ill.
In Canada: Safety Supply Co., Toronto

SEND FOR
Free Record

START SPEAKING
FRENCH OR SPANISH ALMOST OVERNIGHT!

HERE'S the easiest way to learn FRENCH, SPANISH, Russian, German, Italian, Japanese or Brazilian. Listen to FREE 2-sided non-breakable record. Let your eyes follow words in FREE sample lesson. Almost at once you'll be chatting in a new language **with a perfect accent!** Offer may end soon. Rush 25¢ to help cover cost of special packaging, shipping of free record, lesson. State language you want. We'll also send free information on full Cortina course.
CORTINA ACADEMY, Dept. 124, 136 W. 52 St., New York 19, N.Y.

LEARN
DRAFTING
TODAY'S IMPORTANT JOB

CLEVELAND · ENGINEERING · INSTITUTE

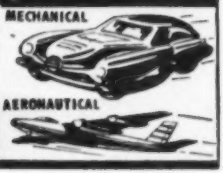
It's Easy—At Home In Your Spare Time

There is a growing, desperate need for draftsmen—the key men in all industry. CEI can quickly give YOU the necessary technical skill. Bigger income, jobs, and opportunities are yours with a CEI diploma. Thousands have succeeded. So can you! CEI guarantees to train you until you qualify. Write today!

You Get This Professional Set of Instruments at no Extra Cost

Cleveland Engineering Institute
Extension Division PS4C
4300 Euclid Avenue,
Cleveland 3, Ohio
( ) Aeronautical ( ) Mechanical
NAME .....
ADDRESS .....
CITY ..... STATE .....
No Obligation—No Salesmen

get FREE success book



CLEVELAND ENGINEERING INSTITUTE

for home owners who care

WARD Tele-vane TV antennas

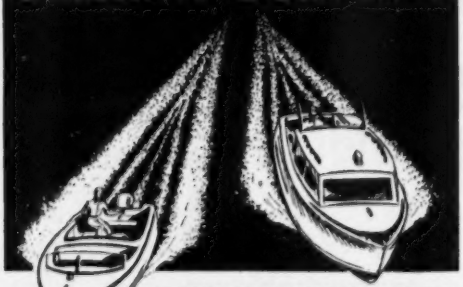
Add beauty to your housetop with a smart modern Ward Tele-vane Antenna . . . and also be assured of peak reception. . . Insist on Ward Tele-vane antennas for your new or replacement installations.

Contact your local TV dealer or service man today about Ward Tele-vanes. Use the coupon below to send for a free descriptive folder.

THE WARD PRODUCTS CORP. division of the Gabriel Co.
1148 EUCLID AVE., CLEVELAND, OHIO

The Ward Products Corp., Div. The GABRIEL Co.
Dept. PS 454, 1148 Euclid Ave.
Cleveland 15, Ohio
Send me free folder describing the complete line of Ward Tele-vane TV Antennas.
Name _____
Address _____
City _____ State _____

U-MAK-IT BOAT KITS



30 OUTBOARD & INBOARD MODELS to choose from:
ROWBOATS • PRAMS • RUNABOUTS • CRUISERS

Now you can build your own boat with simple hand tools and no previous building experience. It's easy—you **save half the cost.** Each part of the famous U-Mak-It boat kit is **precision machined**—frames, stem, transom, keel, and planking, etc., are ready for assembly. Kits are complete in every detail. Only the **finest materials** are used. For high performance, safety and durability investigate U-Mak-It boat kits, today!

SEND FOR BIG ILLUS. CATALOG

Shows complete U-Mak-It line: construction details, incl. everything to build your own. Engines, conversions, hardware, paint and color chart.
SEND 35¢ COIN TODAY!

U-MAK-IT *products*
703 R-Whittier St. • Bronx 59, N.Y. City

LOOK BETTER! FEEL BETTER!

USE A **Vibrosage** ELECTRIC MASSAGER

- Professional-Type
- 4 Scientifically Designed Applicators
- Sanitary

A few minutes daily use of VIBROSAGE gives that stimulating, healthful aid to circulation . . . relief from aches and pains. Four applicators assure maximum effectiveness for scalp, face and body. Operates on 110 volt, 60 cycle A.C. *Five day trial—money-back guarantee!* If your dealer cannot supply you, send $8.50 check or money order, for prepaid shipment. Or, send $2; pay postman balance plus postage and C.O.D. charges.

BEAUTY APPLIANCE CORP., Dept. V534-D. RACINE, WIS.

STUDY AT HOME
WITH AN EDUCATIONAL INSTITUTION

Courses in **ARTS AND SCIENCES:** Philosophy; Education; Letters; Public Health; Medical Jurisprudence; Psychology; Sociology; Physics; Chemistry; Geology; Pol. Science; Theology; Law; Business and Commerce; Accounting; Mathematics; Statistics; Agriculture. **ENGINEERING:** Electrical, Civil, Mechanical, Drafting, Architectural, Steam, Diesel, Aeronautical, Radio, Structural, Mining, Industrial, Petroleum, Refrigeration, Chemical. Send for free catalog.
McKinley-Roosevelt Incorporated, 4610-A3, Sheridan Rd., Chicago 40, Illinois

TASOPE PHOTO-ENGRAVING PLANTS

MATERIAL COST OF THIS CUT 1¼¢ SELLING PRICE $1.00 AND UP

Establish your own profitable PHOTO-ENGRAVING business. Make cuts for newspapers, printers, and advertisers. Make etched name plates, plaques etc. Instructions furnished, no experience necessary. Sold direct from factory since 1931. First five hundred cuts sold locally or by mail will pay for plant and pay you well for your time. Write for FREE catalog.
TASOPE DEPT. PS-4, AURORA, MO.

FREE CRAFT CATALOG

120 PAGES... Craft Supplies, Tools, Designs, Instruction Books from America's Largest, Most Complete Handcraft Stock.
Send for your free copy NOW!
GRIFFIN CRAFT SUPPLIES
5626-B Telegraph Ave. • Oakland 9, Calif.

POWER MOWERS & KITS FREE PLANS

LOW FACTORY PRICES DIRECT TO YOU

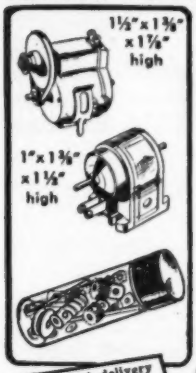
Build your own quality mower with our LOW COST KITS. Parts, Engines. Free Plans guide you. 3 and 4 Wheel Kits, complete. Parts precision finished, ready to use. Write TODAY for Free Plans. Low Prices, Parts List and Guarantee.

America's Finest Power Mowers completely assembled in 3 and 4 wheel models. Belt or direct drive. 18" and 20" sizes. Nationally known make engine. Latest improved features, sturdy construction and money back guarantee fully described in color folder. Write Today.

3-WHEEL KIT NO. T-800

TRIANGLE MANUFACTURING CO., Box S-28, Fort Scott, Kansas

"TINY ATOM" ELECTRIC MOTOR BRINGS YOUR MODELS TO LIFE



Sold by your local dealer or direct from manufacturer — dependable small motors for dry-cell operation. Suitable for hobby, experiment and use by industry. Thousands used on models, toys, displays. *Fully Guaranteed.*

Model 5002—Metal cased, reversible, Alnico-field motor with built-in speed reducer. Pulleys for 4000 and 1000 RPM. Mounting bracket and belt supplied. For 3-4½-6 volts. Price **$3.00.**

Model 3100—"Tiny Atom" motor—speeds up to 6000 RPM. Double extended shaft. Permanent Alnico-V magnet field, wound rotor. Heavy duty transparent plastic case. For 1½-3 volts, price **$2.00.** For higher voltages, price **$2.50.**

Power Accessory Kit K-1300. Vial contains all parts for applying motor power to models, toys, etc. by belt, direct connection, spur gear or worm drive. Price **$1.00.**

Remit with order and we pay postage in U.S.A. No C.O.D. Add 3% Sales Tax for delivery in Ohio. Write Dept. PS.

For quick delivery see your local dealer — or order direct

WILSON'S OF CLEVELAND
425 Lakeside Ave., N.W. • Cleveland 13, Ohio

BECOME AN EXPERT IN TRAFFIC

Traffic men earn $4,000 to $10,000 and up. Thousands of firms need experts on rates, tariffs, regulations. We train you thoroly in spare time at home for executive traffic jobs. Personal training under traffic authorities. Placement counsel and help. Write for free 48-page book "Traffic Management—the Fast Growing Profession."

LASALLE Extension University, 417 So. Dearborn St.
A Correspondence Institution Dept. 483T Chicago 5, Ill.

DR GRABOW PIPES

HE-MAN VOICE!

STRENGTHEN your voice this tested *scientific* way. Yes—you may now be able to improve the POWER of your speaking and singing voice . . . in the privacy of your own room! Self-training lessons, mostly silent. No music required.

FREE BOOK Write TODAY for Eugene Feuchtinger's great booklet "How to Develop a Successful Voice." It's absolutely FREE! You must state your age. Booklet mailed postpaid in plain wrapper. No salesman will call. Send your name and age RIGHT NOW! **Prefect Voice Institute, 210 S. Clinton St., Studio DW-1, Chicago 6, Ill.**

FREE! To New Members IMPORTS FROM FOREIGN LANDS

Free to new members of the International Traders Guild—many unusual, useful products from France, Japan, Germany and other foreign lands, and trade bulletins listing hundreds of import bargains to sell at high U. S. prices. Also requests from overseas buyers for U. S. exports. Opportunity, men—women, profitable, world-wide, mail order business at home; or travel abroad; no capital needed. 2,000 members in 42 countries. 7th successful year. FREE details. Mellinger Co., Dept. 244, Westwood, Los Angeles 24, Calif.

SAVE OIL and ENGINE WEAR with this LONG QUART

This 100% Pennsylvania motor oil with THE *Tough-Film* stands up under intense heat, resists formation of oil-wasting engine deposits. Your engine stays clean, smooth-running, *uses less oil.* And because Pennzoil *lasts* so long, it guards against costly wear caused by acids and friction. Switch to Pennzoil *now!*

As big a difference as ever!

Most motor oils now contain detergents. A detergent's job is not to lubricate, but to improve conditions under which oil lubricates. Pennzoil, too, contains detergents, but its basic lubricating quality, resulting from superbly refined Pennsylvania crude, still provides an *extra* margin of safety.

Sound your Z at this sign...

SOUND YOUR Z
100% Pure Pennsylvania
PENNZOIL
Safe Lubrication

© 1954, The Pennzoil Co.
Member Penn Grade Crude Oil Assn. Permit No. 3

BETTER DEALERS IN EVERY STATE FEATURE PENNZOIL® MOTOR OILS & LUBRICANTS

FREE NEW 1954 4-Color CATALOG of MIDWEST TELEVISION and RADIO

Receivers Featuring BIG 21" and 27" TV Consoles, Table Models and CHASSIS

NOW! with Guaranteed Color TV Trade-In

30 DAYS TRIAL
EASY TERMS

YOUR CHOICE of 12-Channel VHF or All-Channel VHF-UHF Models

FACTORY-TO-YOU!

PRICES BEGIN AT **$149.95**

MIDWEST World-Ranging RADIOS

SEND THIS COUPON ON 2¢ POST CARD FOR NEW 1954 FREE 4 COLOR MIDWEST CATALOG

MIDWEST RADIO & TELEVISION CORP.
Dept. P-24, 909 Broadway, Cincinnati 2, Ohio

NAME _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

LOOK! **A MILLION THRILLS!**

High Power **BINOCULARS**

30 DAY FREE TRIAL
Finest Precision Optics
Money Back Guarantee
Easy Pay Plan

33 Models $9.95 UP

Free! Catalog & Book "How to Select Binoculars"

BUSHNELL *Binoculars*

Dept. P84 43 E. Green Pasadena, Calif.

SAVE $65 ON THIS LUXURIOUS $100 CONTOUR CHAIR **$34.95**

Genuine FOAM RUBBER

For Everything needed complete to

PUT IT TOGETHER IN ONE EVENING!

Make Money Selling and assembling contour chairs for friends

Scientifically correct design for restful, healthful, relaxing. Adjusts for perfect sitting or reclining comfort. Proved beneficial to heart, nerves...most popular chair in every home. Firestone foam rubber and washable, pliable genuine Duran upholstery. Would cost $100 or more in any store. Shipped all ready to put together in less than one evening, by anyone who can use a screwdriver, no cutting, no drilling, no skill needed. A woman can do it. Order now! Everything needed for only $34.95, f.o.b. Balto. State color wanted: forest green, Strato-Grey, lipstick red, walnut brown. Enclose $5 deposit, pay balance on arrival. Money back guarantee. If not satisfied, return in 10 days.

BESTECRAFT, Dept. 64, Mathieson Bldg., Baltimore 2, Md.

AIRPLANE WHEEL ASSEMBLIES

These wheel assemblies are all new, and of heavy duty construction. Depending on load desired to carry, they are ideal for House Movers, Farms, Trailers, Carts, Wheelbarrows, etc.

Complete with Wheel, Tire, Tube and Bearings

Size 26:00, 10 ply tire, smooth tread, uses tapered axle size 3 in. x 2½ in. 10½ in. wide. Overall height 26 in. Static Load 6,300 lbs.
Weight 54 lbs., Price $47.50 ea.

Size 5:00 x 4, 6 ply, smooth tread. Uses straight ⅝ in axle. 3¼ in. wide. Overall height 13 in. Static Load 1,800 lbs.
Weight 8 lbs., Price $12.50 ea.

Size 6 x 2½, solid rubber tire, heavy duty roller bearing, 6" high, 2½" wide, 1" straight axle, static load 500 lbs.
Weight 4 lbs. Price $3.50 ea.

Size 17:00, 6 ply, smooth tread. Uses tapered axle, size 2 in. x 1¾ in. 8 in. wide. Overall height 17 in. Static Load 2,000 lbs.
Weight 18 lbs., Price $17.50 ea.

Size 8:00x4, 4 ply, smooth tread—uses straight 1¼ in. axle, 6 in. wide. Overall height 17 in. Static Load 900 lbs.
Weight 13 lbs., Price $27.50 ea.

Size 10½ x 4, 6 ply ribbed tire. Uses straight ⅝ in. axle. 3¼ in. wide. Overall height 10½ in. Static Load 1,200 lbs.
Weight 8 lbs., Price $9.95 ea.

Prices F.O.B. Chicago. Include approx. postage on orders paid for in advance. C.O.D. orders enclose 25%, balance sent C.O.D

U. A. S. Corp. Dept. PS-4 5637 W. 63rd Pl. Chicago, Ill.

SHORTHAND in 6 WEEKS

Famous SPEEDWRITING shorthand. 120 words per minute. No symbols; no machines; uses ABC's. Easiest to learn; write and transcribe. Low cost. 200,000 taught by mail. For business and Civil Service. Typing available. 31st year. Write for FREE booklet to:

Speedwriting ®

Dept. 2604-4, 55 W. 42 St., New York 36

Men and Women Trained at Home For

Prosperous Business In **UPHOLSTERING**

Tools, Supplies, everything necessary to get started sent. Illustrated training shows how—progress rapidly. No previous experience necessary. Make over old furniture, sell for many times cost to you. Establish full or part time money making business. Free booklet explains plan. Send name, address to

COMMERCIAL TRADES INSTITUTE
1400 Greenleaf Dept. UI-4 Chicago 26, Ill.

MEN WANTED

Earn $100 Per Week and up
AUTO DIESEL MECHANICS

Master a trade with a future—learn Auto-Diesel mechanics in our shops. You learn with tools on real equipment. Earn while you learn. Many of our graduates earn $100 per week and up. No previous experience necessary. Day and night courses. Approved for veterans. Write for free bulletin.

NASHVILLE AUTO-DIESEL COLLEGE
226 7th Ave., N., Dept. 41 Nashville 3, Tenn.

Want a Government Job?

START AS HIGH AS $3,795.00 A YEAR

MEN—WOMEN

Thousands appointments being made. 36-page Book FREE.

Mail Coupon Today. SURE.

Prepare NOW for next exams

COUPON

FRANKLIN INSTITUTE (Not Gov't. Controlled)
Dept. L-80, Rochester 4, N. Y.
Sirs: Rush without charge (1) 36-page book with list of U. S. Government Jobs; (2) Tell me how to qualify for one.

Name .....
Address ..... Age ...

LIQUID PLASTIC

Pours Like Water
Sets Like Glass

CASTOLITE DO-IT-YOURSELF PLASTICS REQUIRE NO SKILL

—**no special tools.** Castolite comes crystal-clear or may be dyed for brilliant color effect. It can be sawed, drilled, turned, carved. You can embed and permanently preserve real flowers, photos, coins, butterflies, insects, stamps, locks of hair, biological specimens, etc.

WHAT YOU CAN MAKE—OR REPAIR

Jewelry Castings; Flower Tiles; Coasters; Photo Placques, Candlesticks, Bookends; Paper Weights, Figurines; Key Tags, Purse Pulls; Buttons; Lamp Bases; Fish Lures; Advertising Specialties; Scientific Displays; Molds; Models; Mechanical Parts. **Leak-proof** boats, tanks, pipes. **Repair** furniture, gun stocks, etc. **Build** new boats, surf boards, tanks that will never rust—many other things.

SOUND PROFIT OPPORTUNITIES

Save money. **Make** money, have fun! You can get professional results even in your kitchen. **"How to Cast With Castolite"** tells all! **Only 25c**—includes **FREE** manuals! **"How to Make Jewelry"** and **"Home Success Plan."** Write Dept. D-2

25¢

THE CASTOLITE CO., Woodstock, Illinois

GROW ORCHIDS AT HOME

BIG PROFITS!! SPARE—FULL TIME

World's most thrilling hobby—profitable home business. Single Orchid plant may multiply into many—each as valuable as the first. **Successful home grower shows you how! Raise** gorgeous Cattleyas, Cymbidiums, Epidendrums, on living-room table. **Big-profit orders come from friends, neighbors, florists, etc.—also Mail Orders.** Illustrated secrets of the experts in simple "show-how" language **AND blooming-size Orchid plants sent at NO RISK. Everything you need to start—for pleasure or profit. FREE**—full details—**SEND NO MONEY.** Write **today. TROPICAL FLOWERLAND,** Dept. 24. 6622 Wilshire Blvd., Los Angeles 5, California

A "GOOD HAND" HELPS YOU SUCCEED!

LEARN TO WRITE WELL

Your Name beautifully written, plus special pen-point for shaded writing. *Only 10¢*

Handwriting quickly improves with our easy-to-understand picture lessons! Put your spare time to good use: send today for ☐ **FREE BOOKLET,** "How to Become a Good Penman," or check volumes wanted below at $1 each: ☐ Business Writing ☐ Artistic Writing ☐ Card Writing ☐ Bird & Design Flourishing ☐ Engrossing Alphabets. **COMPLETE SET $4.50.** Ask for price list of penman's supplies.

OUR 53rd YEAR

TAMBLYN SCHOOL of PENMANSHIP

S. A. Zeller, Pres. 438 Ridge Bldg., Kansas City, Mo., USA

!!! SAVE $25.00 !!!

16" ELECTRIC, made by a leading rotary mower builder to sell at $64.50, only

$39.50 FOB K.C., MO.

(Use #16 or heavier cord)

- ⅓ H.P. Delco motor with overload switch.
- Trimmer type aluminum alloy base.
- Adjustable floating handle.
- 1-2-3" cutting heights.
- 3 replaceable knives.

Shpg. wt. 46 lbs. Send check or M.O. for 39.50. Shipping charges collect.

LIMITED SUPPLY!

Write for literature

WESTPORT INDUSTRIES

Box 5870, WESTPORT STATION, KANSAS CITY, MISSOURI

Guard NOW against summer overheating

1. Drain out winter-worn anti-freeze and clean with DU PONT COOLING SYSTEM CLEANSER

Do it *before* the first summer day can cause overheating! Du Pont Cooling System Cleanser gets rid of rust, scale, grease . . . works as you drive. Thorough, safe, simple.

2. Put in Du Pont Anti-Rust

Just pour it in and leave it in!

Just as you pour in anti-freeze for winter, pour in Anti-Rust for summer. Du Pont Anti-Rust protects against the most common causes of overheating. Its special rust-inhibiting action keeps water from rusting in the cooling system. And, at the same time, Anti-Rust keeps out acids and lubricates the water pump—helps prevent squeaking. Simple to use—just pour in liquid Du Pont Anti-Rust and forget it!

ASK ABOUT THE COMPLETE DU PONT SPRING DRAIN-OUT

Includes drain-out, clean-out, adding Du Pont Anti-Rust plus complete cooling system check-up. At garages, car dealers and service stations.

DU PONT No 7. PRODUCTS

From Chemical Research . . . For Easier Car Care

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

The WONDERS of LIQUID PLASTICS

MANUFACTURE WITHOUT TOOLS OR MACHINERY!

EASILY MAKE $5.00 AN HOUR!

No previous experience or special ability required! NO TOOLS OR MACHINERY required . . . *the entire process is about as easy as pouring water out of a glass!* The WONDERS OF LIQUID PLASTICS make all this possible! Many of the products made with our liquid plastics are so beautiful and attractive that we have created an unusual demand for this type of merchandise! That's why we will pay you $5.00 an hour (materials extra) to make the items shown here and in our catalog for us!

UNLIMITED POSSIBILITIES

Work with LIQUID IVORY, LIQUID GLASS, LIQUID MARBLE, LIQUID EBONY, LIQUID PORCELAIN, LIQUID WOOD, LIQUID GEMSTONE and many other LIQUID PLASTICS and in a matter of minutes turn them into an endless and valuable procession of beautiful imbedded jewelry, novelties, ornamentals, statues, bookends, lamps, pensets, lighters, ashtrays, keychains, figurines, curios, SOUVENIRS, art and gift products, fishing lures, BOATS, GADGETS galore, exquisite GEMS! Make gears, tools, dies, forms, handles, dials, knobs, MACHINE PARTS, models of inventions, pistol grips . . . the list is endless! The only LIMITATION is your IMAGINATION! Liquid Plastics are the blessing of every creative and ambitious person . . . with these materials ANYONE can create and manufacture by the THOUSANDS and at a tiny fraction of what it would cost by any other method! Just send 25c and we will send you our book, "HOW TO MANUFACTURE WITHOUT TOOLS OR MACHINERY," included with our big 64 page catalog describing all the materials mentioned above; also details of our $5.00-an-hour offer!

PLASTICAST CO., (Dept. A)
P.O. Box 6737 *(Write to either address)* **Chicago 80, Ill.** — **P.O. Box 987 Palo Alto, Calif.**

PLASTIC LAMINATING

This remarkable Plastic Laminating Machine will earn $18.00 an hour right in your kitchen! Big profits laminating Business, Social Security, Identification, Credit CARDS of all kinds, photos, masses, clippings, etc. Price complete (illustrated) $35.00 plus postage. Others higher. **Free literature! PLASTICAST CO.** (Addresses above)

STUDY AT HOME **LAW** FREE BOOK!

PREPARE FOR THE BAR

Write today for your copy of our FREE book, **"THE LAW-TRAINED MAN,"** which describes the famous Blackstone home-study course in bar and business law. All needed instruction material furnished including big 16-volume law library. Bachelor of Laws (LL.B.) degree awarded. Moderate tuition; easy monthly terms. Write today.

Blackstone School of Law — **225 N. Michigan Ave.**
Founded 1890 — **Dept. 124, Chicago 1, Illinois**

Ball-Bearing SPEED WHEELS

JUVENILE WHEELS (No bearing, solid tires)

5"	.45c	6"	.65c
7"	.75c		

(Semi-pneumatic tire, ball bearing)

8x1.25	$1.85	10x1.25	$2.20
8x1.75	1.95	10x1.75	2.30
8x2	2.20	10x2	2.65
12x1.75	$3.45		

INDUSTRIAL WHEELS

(Lug Base Semi-Pneumatic tire)

6x2 SW	$3.45	10x2.00	$6.10
6x2.00	4.00	10x2.75	5.15
8x2.00	5.20	10x2.75 Pneu.	6.90
8x2.50	5.40	12x2.00	6.90
16x4.00	15.15	12x3.00	9.20

(Smooth Base, Pneumatic tire and tube)

8x3 2 ply	$10.00
10x3.50 2 ply	10.55
12x4 2 ply	14.41
4.00x8 2 ply	13.10
14x4.50 2 ply	15.96

CASTERS—Now Available — Write for circulars on all wheels.
No c.o.d. orders. Prices F.O.B. our plant.

JIM BROWN TOY COMPANY
1095 HOME AVENUE — **PS-454** — **AKRON 10, OHIO**

NEW FALSE PLATE

FROM YOUR OLD ONE IN **18** HOURS

AS LOW AS $14.95

Send us your old broken, cracked or loose plates and we'll transform them into new lightweight wonder plastic plates. NO IMPRESSIONS needed with our revolutionary method. We use your own old plates. We remake them completely in only 18 hours. Missing teeth carefully matched and replaced. We GUARANTEE TO SATISFY YOU OR REFUND YOUR MONEY.

SEND NO MONEY—Send us your name today and we'll RUSH COMPLETE DETAILS. Begin to enjoy life right now. Clip this Ad; save it and send for free facts.

CHICAGO DENTAL PLATE LABORATORY • Dept. PS-454
30 N. Dearborn St. • Suite 807 • Chicago 2, Ill.

How to Make Money in PHOTOGRAPHY

If you are OVER 17—good pay, fascinating work await you in photography! Start making money quickly in sparetime—step into your own studio or exciting job. LEARN-BY-DOING method trains you at home! Write TODAY for FREE catalog. Also Resident Training. 44th Year! GI Approved.

Send for FREE BOOK

NEW YORK INSTITUTE OF PHOTOGRAPHY
Dept. 5, 10 W. 33 St., New York 1, N. Y.

SEND FOR THIS FREE!

Make money. Know how to break and train horses. *Write today for this book FREE,* together with special offer of a course in Animal Breeding. If you are interested in Gaiting and Riding the saddle horse, check here ( ) *Do it today—now.*

BEERY SCHOOL OF HORSEMANSHIP
Dept. 584 — **Pleasant Hill, Ohio**

Give ME 15 MINUTES A DAY To Prove I Can make YOU a *NEW MAN!*

That's all I want—**just 15 minutes a day** to prove I can give you a powerful body of might and muscle—with my quick **"Dynamic-Tension"** method.

Mail coupon below—and I'll send you, **absolutely free**, my new book, "Everlasting Health and Strength." Reveals secrets that changed me from a 97-pound weakling to winner of title, "World's Most Perfectly-Developed Man." Shows how I can build you a champion body the same easy way!

I've taken thousands of flabby men and given them powerful muscles, increased measurements, amazing strength, vitality, pep. My natural **"Dynamic-Tension"** method develops real men!

Send NOW for free copy of my book filled with pictures and body facts. Find out how I can make **you** the husky, big-muscled NEW MAN you **can** be! Mail coupon TODAY. **CHARLES ATLAS, Dept. 1D, 115 East 23 St., N. Y. 10, N. Y.**

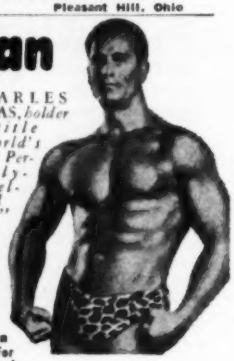
CHARLES ATLAS, Dept. 1D,
115 East 23rd Street, New York 10, N. Y.

Send me your Free Book which proves how **"Dynamic Tension"** can make me a NEW MAN.

Name.....Age.....

Address.....

City.....State.....



CHARLES ATLAS, *holder of title "World's Most Perfectly-Developed Man."*

Mail Coupon Now For Free Book

"Building Beautifiers" Can Earn High Incomes

Colorcrete, a cementitious plastic, gives lifetime beauty and protection to drab, dirty masonry — concrete, stucco, etc. — on all kinds of buildings. Tough, tenacious, enduring. Easily cleaned. Helps to daylight dark interiors. Choice of gleaming white or 30 colors. Applied under pneumatic pressure to form an inseparable bond.

More Colorcretors are needed to supply the ever-increasing demand. Low investment appeals to men of limited capital. Work is easy, fascinating, highly profitable. Broad opportunity to develop a lifetime business. No special ability or experience needed because we supply full instructions and sales cooperation. Colorcrete machine is simple to operate, easy to move around. Write today for Opportunity Book.

Colorcrete Industries, Inc.
572 Ottawa Av., Holland, Mich.
COLORCRETE CS

POWERFUL! LOW COST!
Light • Rugged • Maneuverable

America's best tractor value. More usable power — pulling, pushing, driving. 770 LBS. Pulls 12 in. plow. 8.4 H. P. B&S engine. Gear drive B-W 4 speed Trans., Clutch, Diff Roller Bearings. Full line implements. 100% satisfaction guaranteed.

Write for FREE CATALOG
COUNTRY SQUIRE TRACTOR CO.
P.O. Box 107-A-4
Muskego, Wisconsin

Country Squire TRACTOR

.22 RIFLE BARGAIN

CARBINE STYLE

34 inches long
Weighs 4 lbs.

$14.95

EXCLUSIVE WITH UNITED! GERMAN Feather-weight precision made rifle. Simplified rugged construction . . . one screw take down assembly. Has automatic ejector with self adjusting sporting rear sight, blade front sight. Barrel has SIX lands! Blued thru-out. **HIGHLY POLISHED BOLT ACTION.** Amazing accuracy at 100 yard range! Replacement parts easily secured if ever needed.

SHOOTS AMERICAN LONGS, SHORTS, LONG RIFLE (regular & high powered). **10 DAY NO RISK TRIAL.** If not satisfied return for refund. Transportation collect. C.O.D.'s require $2.00 deposit. Mail Orders Only. None sold to minors. **STATE AGE.**
UNITED ARMS CO., 9043 S. Western, Dept. CHOB-2355, Chicago 20.

INSURED TIRE SERVICE
POPULAR BRANDS

SPECIAL! Deduct 10% on orders for Two or More used tires

FREE INSURANCE POLICY given with each used tire sold. We guarantee the amount of service you pay for.

Tube Given Free with Each Used Passenger Tire Upon Request

YOU CAN'T LOSE!!

Super Quality — Rugged Performance — 15 Months Insured Service

600x16	$3.65	670x15	$3.95	700x16	$4.45	760x16	$4.75
650x15	3.85	670x16	4.05	710x15	4.35	820x15	4.95
650x16	4.25	700x16	3.95	760x15	4.45	550x17	4.65

Supreme Quality — Nothing Finer — 30 Months Insured Service

600x16	$5.25	475x19	$5.45	700x15 6	$10.45	700x20	$12.50
600x16 6	6.75	640x15	4.95	750x16 8	15.95	750x20 8	15.50
650x16	5.75	670x15	5.35	700x17	11.95	750x20 10	17.50
650x16 6	7.25	710x15	5.45	750x17	16.45	825x20	21.50
700x16	6.35	760x15	5.95	750x15	10.95	900x20	19.95
750x16 6	8.45	800x15	6.35	30x5	11.25	1000x20	20.45
550x18	4.95	820x15	6.35	600x20	10.95	1100x20	21.25
550x17	4.75	550x15	5.35	650x20	11.75	1000x22	21.95
650x15	5.25	670x16	5.15	32x6 8	11.95	1100x22	22.75
700x15	5.35	700x16 6	10.25	32x6 10	12.75	1100x24	28.95

Whitewalls $1.00 extra

MIDLAND TIRE SALES

Speedy shipments on Mail Orders. F.O.B. Chicago. Insurance Policy sent with each order. Deduct 10% on orders for 2 or more used tires. Send CHECK or MONEY ORDER. No COD's.
3701 S. Normal, Dept. SS-18, Chicago 9, Ill.

INSTALL IT *Yourself* and SAVE!

YOU CAN GET 25 to 40% BETTER RECEPTION on your present TV Set... and you're READY FOR COLOR!

ANTENNA KITS FROM Admiral

WORLD'S LARGEST TELEVISION MANUFACTURER

Priced from **$13.95** LIST at your *Admiral* dealer

UHF Kits
VHF Kits
All-Channel Kits

Kits contain everything needed...antenna, mast, mast mount, guy wires, insulators, lead-in...down to the last screw-eye. Step-by-step instructions are easy to follow. No experience or special tools needed. High-gain antennas get excellent reception. Finest quality, tested and guaranteed by Admiral. Buy from your Admiral dealer.

BE YOUR OWN MUSIC TEACHER

Send for Free Book Telling How Easily You Can Learn Piano, Guitar, Accordion, ANY Instrument This EASY A-B-C Way

NOW IT'S EASY to learn music at home. No tiresome "exercises." No teacher, just START RIGHT OUT playing simple pieces. Thousands now play who never thought they could. Our pictured lessons make it easy as A-B-C to learn to play popular music, hymns, classical and any other music. Only a few cents a lesson. Over 900,000 students! (Our 56th successful year.)

FREE BOOK and LESSON-SAMPLE

Find out why our method can teach you quickly, easily, inexpensively. Write for Free Book and Free Lesson-Sample. No obligation. Mention your favorite instrument. Just Mail coupon below.

U. S. SCHOOL OF MUSIC
Studio 154
PORT WASHINGTON, N. Y.

U. S. SCHOOL OF MUSIC, Studio 154, Port Washington, N. Y.
Please send me Free Booklet and Lesson-Sample. I would like to play (Name Instrument).

Instrument ..... Have you Instrument? .....

Name .....
(Please Print)

Address .....

HYPNOTISM

Thousands now use Hypnotism and Autosuggestion who never thought it possible!

• Do you think it's difficult to learn to practice Hypnotism and Autosuggestion? That's what thousands of others have thought! Just like you, they longed to practice this tremendous, powerful science, but they thought it impossible or unbelievable.

But they made an amazing discovery! They learned about a wonderful, simple way to learn Hypnotism and Autosuggestion at home—without tedious study—and in a surprisingly short time. They wrote to the School of Applied Hypnology about this remarkable proven short-cut method. Our illustrated brochure actually showed them how easy it was to learn this powerful science.

The result! Thousands of men and women have mastered Hypnotism and Autosuggestion at home with this simple, proven way. They have found the key to good times, popularity and success.

And that's what you can do right now. Simply mail the coupon, get the proof that you, too, can become an expert hypnotist quickly, easily, in spare time at home. With guaranteed results. Read the fascinating illustrated brochure. Read some of the wonderful testimonials from successful students. (We have thousands of testimonials on file from successful students all over the world.)

Tear out and mail the coupon to America's oldest Hypnotic school for free information, Now—TODAY.

SCHOOL OF APPLIED HYPNOLOGY Dept. 24
120 Central Park South
New York 19, N. Y.
Sent in plain wrapper

Please send me Free Information:

NAME _____

ADDRESS _____

CITY _____ STATE _____

You're in good company when you own a "WOLVERINE"

Preferred by boating enthusiasts throughout the nation. Improved design and quality construction insures top performance, and years of pleasure when you own a "Wolverine." Enjoy greater speed—better maneuverability. Over 50 models to choose from including Aluminum boats. Send for free folder today!

WAGEMAKER COMPANY
Dept. 36 Grand Rapids, Michigan

Auxiliary Accelerator
LEFT FOOT PEDAL

Auxiliary Accelerator Left Foot Gas Pedal makes driving a pleasure. Permits you to relax, and use left or right foot with equal ease. Fits all cars, either clutch or automatic drive.

Guaranteed for Life of Car on Which Originally Installed

Price $6.95 Delivered to You Patented **Order from R. V. LEHNER, NESS CITY, KANSAS**

CASTING SECRETS REVEALED!

Now you can learn how to make big money by casting thousands of perfect plaques, book ends, figurines, etc., with X-L rubber molds.

NO EXPERIENCE, VERY LITTLE CAPITAL NEEDED.

X-L Rubber, Pts. $2.50; Qts. $4.00 (postage extra). Molds and enough rubber for three molds, $1.50 prepaid. U. S. only. Send 25c (refunded with order) for informative catalog (40 pages) describing this wonderful, exciting *Profit-making* business.

HUGE PROFITS! MORE MONEY!

PLASTIC ARTS STUDIO 3403 S. MADISON, DEPT. 3 MUNCIE, INDIANA

MASTER MIND!

Learn Short-Cut Mathematics

Juggle figures, do baffling number tricks. Make people gasp at your marvelous *lightning-quick* mind. Multiply 4 figures by 4 figures without using old-fashioned multiplication! Big cloth-bound volume; fully illustrated course for self-instruction.

Sharpen up Your Brain Power

Includes worked-out problems, answers, etc. Sensational bargain, only $2.95, postpaid or COD plus postage. Satisfaction guaranteed or refund. Order this amazing "Short-Cut Mathematics" today!

NELSON-HALL CO., 210 S. Clinton St.
Dept. 4DW-1 Chicago 6, Ill.

$2.95 Complete

WATCHMAKING

FREE SAMPLE LESSON Cash in on growing opportunities. Study at home or in person with Chicago School of Watchmaking. Approved for veterans.

CHICAGO SCHOOL OF WATCHMAKING

2330 Milwaukee Ave., Dept. 444, Chicago 47, Ill. ☐ Veteran
Send my FREE Sample Lesson. ☐ Home Study ☐ Resident Sch.

Name.....
Address.....
City..... Zone..... State.....

A third hand for painters!

WHIZZER Can and Brush Holder

NO MORE PAINT DRIP!

Smooth, durable plastic pistol grip, spring steel band holds all quart cans firmly. Brush clip eliminates drips, messy brush handles, smeared hands. Carry paint and brush easily, safely, comfortably, even while climbing ladders. Guaranteed.

If dealer can't supply you, order direct. $1.00 *Postpaid*

WHIZZER PRODUCTS CO., 340 S. SANFORD, PONTIAC, MICH.

LEARN TO DANCE $1.00

Why be a lonely, unpopular wall-flower?
Learn all the smart dances from the most modern to the old favorites—at home, in private without teacher, music or partner. So simple even a child can learn quickly. Tap dancing, Waltz, Collegiate, Samba, Rhumba, Jitterbug and many others, including illustrations. Complete course only $1.00. Also, delightful old square dances with illustrations for $1.00. Get each Separate or both for $1.98. If you order both take your choice of FREE-DREAM BOOK or LOVE LETTERS. C.O.D. orders 25c extra and Postage.
Superior professional taps, both toes and heels $2.95 prepaid or C.O.D. plus shipping charges. State size, large or small.

ROLLDEX, P. O. Box 516, Dept. D-85, Safety Harbor, Fla.

TREASURE -- $10,000

New locator detects metals, valuable minerals and buried treasure. Money-back guarantee of superiority.

Also geiger counters. Govt. reward of $10,000 for uranium discovery. Write for FREE information.

THE GOLDAK COMPANY
1544 W. GLENOAKS BLVD., GLENDALE 1, CALIF.

DRAW The First Day!

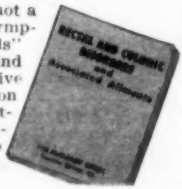
NO LESSONS! NO TALENT!

New Amazing Invention—"Magic Art Reproducer." You can draw Your Family, Friends, Anything From REAL LIFE—Like An Artist Even If You CAN'T DRAW A Straight Line! Anything you want to draw is automatically seen on any sheet of paper thru the "Magic Art Reproducer." Then easily follow the lines of the "picture image" with a pencil for an original "professional looking" drawing. Also reduces or enlarges. SEND NO MONEY! Free 10 Day Trial! Pay Postman on delivery $1.98 plus postage. Or send only $1.98 with order and we pay postage. Money Back Guarantee.

NORTON PRODUCTS, Dept. 4404K, 296 Broadway, N.Y.C.

Is CONSTIPATION Warning You Of Something That May Be Dangerous?

Chronic constipation is usually not a disease in itself; it is often a symptom of something else that "pills" can give little help to. Why not find out **new,** from an authoritative source, what your constipation may mean—and the modern treatment for it? Write today for important FREE book of facts to McCleary Hospital, 471 Elms Blvd., Excelsior Springs, Mo.



WHAT ALL AUTO MECHANICS WANT TO KNOW

1664 PAGES

This Big Practical Book gives full information with working diagrams covering the principles, construction, ignition, service and repair of modern cars, trucks and buses.

Diesel Engines, Hydramatic & Fluid Drives Fully Explained.

A complete Guide of pages, with over 1500 illustrations showing inside views of working parts, with instructions for service jobs.

IT PAYS TO KNOW

How to fit pistons—How to locate engine knocks. How to fit connecting rod bearings—How to service main bearings—How to recondition valves—How to time valves—How to adjust fan belts—How to adjust carburetors and chokes. How to rebuild a clutch—How to service automatic transmissions—How to service brakes—How to adjust steering gear—How to cope with ignition troubles—How to service distributors—How to time ignition—How to "tune up" an engine.

$4 COMPLETE • PAY $1 A MO.
TO GET THIS ASSISTANCE FOR YOURSELF SIMPLY FILL IN AND MAIL COUPON TODAY.

Step up your own skill with the facts and figures of your trade. Audels Mechanics Guides contain Practical Inside Trade Information in a Handy Form. Fully illustrated and Easy to Understand. Highly Endorsed. Check the book you want for 7 DAYS FREE EXAMINATION. Send No Money. Nothing to pay postman.

MAIL ORDER

AUDEL, Publishers, 49 W. 23 St., NEW YORK 10, N. Y.

Please send me postpaid for FREE EXAMINATION books marked x below. If I decide to keep them I agree to mail $1 in 7 Days on each book or set ordered and further mail $1 monthly on each book or set until I have paid price, otherwise I will return them.

- ☐ AUTOMOBILE MECHANICS GUIDE $4
- ☐ TRUCK & TRACTOR GUIDE, 1799 Pages 4
- ☐ DIESEL ENGINE MANUAL, 575 Pages 2
- ☐ MACHINISTS HANDY BOOK, 1650 Pages 4
- ☐ WELDERS GUIDE, 400 Pages 1
- ☐ BLUE PRINT READING, 416 Pages 2
- ☐ MATHEMATICS & CALCULATIONS, 700 Pages 2
- ☐ SHEET METAL PATTERN LAYOUTS, 1100 Pages 4
- ☐ SHEET METAL WORKERS HANDY BOOK, 388 Pgs. 1
- ☐ MECHANICAL DRAWING GUIDE, 160 Pages 1
- ☐ MECHANICAL DRAWING & DESIGN, 480 Pages 2
- ☐ AIRCRAFT WORKER, 240 Pages 1
- ☐ TELEVISION SERVICE MANUAL, 384 Pages 2
- ☐ RADIOMANS GUIDE, 914 Pages 4
- ☐ ELECTRONIC DEVICES, 216 Pages 2
- ☐ ELECTRIC MOTOR GUIDE, 1000 Pages 4
- ☐ ELECTRIC WIRING DIAGRAMS, 272 Pages 1
- ☐ ELECTRICIANS EXAMINATIONS, 250 Pages 1
- ☐ ELECTRIC POWER CALCULATIONS, 425 Pages 2
- ☐ HANDY BOOK OF ELECTRICITY, 1440 Pages 4
- ☐ ELECTRIC DICTIONARY, 9000 Terms 2
- ☐ ELECTRIC LIBRARY, 7000 Pages (12 Book Set) 18
- ☐ MARINE ENGINEERS HANDY BOOK, 1258 Pgs. 4
- ☐ SHIPFITTERS HANDY BOOK, 250 Pages 1
- ☐ REFRIGERATION & Air Conditioning, 1280 Pgs. 4
- ☐ MILLWRIGHTS & MECHANICS GUIDE, 1200 Pgs. 4
- ☐ POWER PLANT ENGINEERS GUIDE, 1500 Pages 4
- ☐ ENGINEERS & FIREMANS EXAMS, 525 Pages 1
- ☐ PUMPS, Hydraulics & Air Compressors, 1658 Pgs. 4
- ☐ ENGINEERS LIBRARY (3 Book Set) 9
- ☐ MECHANICAL DICTIONARY, 950 Pages 4
- ☐ GARDENERS & GROWERS GUIDES (4 Book Set) 6
- ☐ CARPENTERS & BUILDERS GUIDES (4 Book Set) 6
- ☐ PLUMBERS & Steamfitters Guides (4 Book Set) 6
- ☐ MASONS AND BUILDERS GUIDES (4 Book Set) 6
- ☐ PAINTERS & DECORATORS MANUAL, 450 Pgs. 2
- ☐ HOUSE HEATING GUIDE, 1000 Pages 4
- ☐ OIL BURNER GUIDE, 384 Pages 1

Check NOW!

You Can Look Over Any Guide In Your Own Home — Start the Easy Payments If Satisfied

MAIL THIS TODAY

Name _____
Address _____
Occupation _____
Employed by _____ S4

Learn ELECTRIC APPLIANCE REPAIR IN YOUR SPARE TIME AT HOME

START YOUR OWN BUSINESS WITH A POTENTIAL MARKET OF 50,000,000 CUSTOMERS

ONE BUSINESS THAT IS NOT AFFECTED by STRIKES, DEPRESSIONS OR POLITICS

New shop-method, home training system gives you electrical know-how that used to take years to learn. Learn at home by building valuable testing kits, repairing your own and neighbors' appliances. It is not unusual for appliance repairmen to charge on the basis of $5.00-$6.00 an hour.

FREE ILLUSTRATED BOOK

Shows you how you learn every phase of electrical appliance. How to make money while you learn. Write today for your FREE copy.

CHRISTY TRADES SCHOOL
Dept. D-3801
4804 North Kedzie Ave., Chicago 25

BRAND NEW! Firestone TIRES

SAVE UP TO 50%

SEND FOR FREE CATALOG

All Tires Carry Famous Firestone Unconditional Guarantee

BRAND NEW—FIRST QUALITY FIRESTONE PASSENGER TIRES

BLACK WALL TIRES 4 PLY FULL PRICE	
640 x 15	11.62
650 x 15	14.29
670 x 15	12.50
710 x 15	13.88
760 x 15	15.12
600 x 16	11.12
650 x 16	14.73

WHITEWALL TIRES Special Brand New (Factory Blemish) First Line 4 ply Pass.

670 x 15	15.24
710 x 15	16.83
760 x 15	18.41
800 x 15	20.23
820 x 15	21.04

SUPER SPECIAL! 1st Qual. Armstrong

670 x 15	11.91

BRAND NEW—FIRST LINE—HEAVY DUTY FIRST QUALITY—SENSATIONAL VALUES

TRUCK TIRES

Size		Full Price	Size		Full Price
700x15	6 ply	25.79	750x20	10 ply	50.42
600x16	6 ply	17.78	825x20	10 ply	58.50
650x16	6 ply	21.56	825x20	12 ply	69.73
700x17	6 ply	30.75	900x20	10 ply	70.55
600x20	6 ply	24.31	900x20	12 ply	83.84
650x20	8 ply	31.47	1000x20	12 ply	89.27
700x20	8 ply	35.45	1100x20	12 ply	104.78
700x20	10 ply	42.48	1000x22	12 ply	94.08
750x20	8 ply	45.15	1100x22	12 ply	110.75
			1100x24	12 ply	115.10

(Order by Mail—Send check or M.O.) • (all prices f.o.b. plant)
Farmers—Full line of tractor tires—Write for Prices

S & S TIRE CO. HADDON AND BRADLEY AVES. CAMDEN 3, N. J.

LAW

Men and Women STUDY AT HOME for Business Success and LARGER PERSONAL EARNINGS, 44 years expert instruction—over 114,000 students enrolled. LL.B. Degree awarded. All text material furnished. Easy payment plan. Send for FREE BOOK —"Law and Executive Guidance"—NOW!

AMERICAN EXTENSION SCHOOL OF LAW
Dept. P5-73, 664 N. Michigan Ave., Chicago 11, Illinois

LEARN MEAT CUTTING

Train quickly in 8 short weeks at Toledo for a bright future with security in the vital meat business. Big pay, full-time jobs—HAVE A PROFITABLE MARKET OF YOUR OWN! Pay after graduation. Diploma given. Job help. Thousands of successful graduates. Our 31st year! Send NOW for FREE catalog. No obligation. G. I. Approved.

NATIONAL SCHOOL OF MEAT CUTTING, Dept. 51-D, Toledo 4, Ohio

Save that PAINT BRUSH
—now more valuable than ever

Perfect for NYLON BRUSHES

10c
25c

KEEP BRUSHES LIKE NEW WITH DIC-A-DOO

At Paint, Hardware, Dept., and 5 & 10¢ Stores

Patent Cereals Co. Geneva, New York

Secrets of VENTRILOQUISM Now Revealed!

Easy to learn in 60 to 90 days with our Home Study Course. RESULTS GUARANTEED. Make Money! Be Popular! Have Fun! Big Opportunity! Radio, Television, Stage Appearances! For Free Information regarding price and terms, WRITE. You must state your age. Dummy Catalog 25c.

FRED MAHER SCHOOL OF VENTRILOQUISM
Box 36, Studio PS-D Kensington Station
Detroit 24, Michigan

When Writing To Advertisers Please Mention Popular Science

SLIP OVER —TACK IN

DENIM SEAT JEANS

(Free Upholstery Tacks, At No Extra Charge.)

- Sanforized—Washable
- "Custom Effect"
- Smart Candy Stripe
- Protects Upholstery
- Will Fit Most Cars
- Reversible
- Split or Solid Front and Solid Rear

Tough DENIM material is long wearing. Bright color print will dress up car and add to looks.

Specify if Split or Solid Front Seat

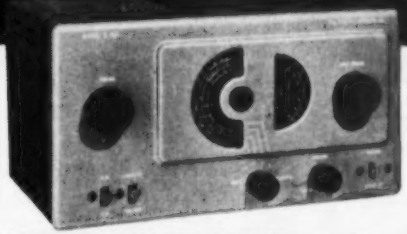
Enclose payment for $2.98 for Front or Rear Seat plus 25c Postage or $5.75 plus 25c Postage for both Front and Rear Seats. Or sent C.O.D. 10 DAY MONEY BACK.

NEW PRICE $2.98 each
Formerly sold for $3.98

MARDO SALES CORP.—Dept. DM-116
480 LEXINGTON AVENUE NEW YORK, N. Y.

ARE YOU MISSING THE BIGGEST THRILLS IN RADIO?

Get a hallicrafters Short-Wave and Hear it All!



You don't know how exciting radio can be until you've listened to today's short-wave. You hear stations from all over the world—broadcasting both in their own languages and English—mostly English. You hear ships at sea, planes in the air, police and military broadcasts that trigger tomorrow's headlines. You hear London, Paris, Rome, Rio—Moscow propaganda and our answers to it on the Voice of America. And plenty more!

Hallicrafters is by long odds the leader in the short-wave field. An unmatched record of dependability with amateurs, plus 20 years' experience in producing vital military radio communications equipment, stand back of every receiver sold under the Hallicrafters name. See your dealer today. Hear a Hallicrafters—and you'll choose a Hallicrafters!

FAMOUS HALLICRAFTERS S-38C—Most popular communications-type receiver in the world! Has electrical bandspread tuning to separate crowded stations. High gain circuit pulls in stations from all over the world. You hear five wave-bands. Regular broadcast plus 540 kc to 32 mc. Operates on regular 110 V AC/DC. **Only $49.95**

hallicrafters

The Name Is Famous

Radio • Television • High Fidelity

4401 West Fifth Avenue, Chicago 24, Illinois • Hallicrafters Ltd., 51 Camden Street, Toronto, Canada

---

COMPACT • SELF-CONTAINED • BATTERY OPERATED

Never before has a portable blacklite instrument of comparable quality been offered at this low price. Geologists, engineers, miners, prospectors and hobbyists will find this instrument perfect for field trips and lab work. The unit is completely self-contained and battery operated, mounts 4 watt long wave ultra-violet bulb recessed in a compact, sturdy all-metal case. Features chrome handle and black-wrinkle finish. Weight only 6 lbs. . . . measures 7" x 3⅛" x 4⅛" D. When ordering specify choice . . . with or without batteries.

ONLY $12.95 less batteries

BATTERIES $2.25 ea. 2-required

write today—free literature on blacklite

SPECIAL

PORTABLE AIR COMPRESSOR

Model R-400 high output 3-stage compressor charges up to 1500 psi. Driven by 27 VDC-20 amp motor . . . easily converted with ½ horse power motor to pulley-belt drive. Measures 12¾"x10½", extremely lightweight. Mfr.: Cornelius.

$69.50 Priced F.O.B.

PLEASE ENCLOSE FULL AMOUNT WITH ORDER

C & H SALES CO.

2176-PA E. Colorado St. · Pasadena 8, Calif.

FOR FAST AND EASIER STARTING . . . AND A SMOOTHER, MORE POWERFUL MOTOR

NO FUSS—NO MUSS—JUST POUR—NO MORE

● More Miles Per Gallon . . . Due to More Efficient Carburetor Operation ● Cleans Clogged Carburetors and Gas Lines Without Removing Carburetors ● Dissolves Gum and Varnish Thus Reducing Frictional Drag and Wear ● Eliminates Water in the Gas Tank and Fuel System ● Gas Tank Anti-Freeze ● Rust Proofs Fuel System. Also an Excellent Parts Cleaner for Parts and Equipment and Ideal for Heavy Duty Cleaning Around the Home.

PROTECT YOUR CAR NOW — Buy Carb Master at your local Service Station. Ask Your Service Station Operator About

RUST MASTER, SLUDG-MASTER and LEAK MASTER

If he cannot supply you, write for name of nearest dealer.

PRODUCTS WORK WHILE YOU RIDE

Chemical Company
Mfg. Chemists

54 CREIGHTON ST., CAMBRIDGE, MASS.

THE SILENT PARTNERS OF MOTOR EFFICIENCY

Solingen Steel HUNTING KNIFE

$3.95

MAKE THIS TEST!

Place a coin the size of a half dollar on some pieces of thick cardboard. Plunge the point of the Black Forest Knife downward. The knife will completely pierce the thick coin — without ANY damage to the blade!

DIRECT FROM GERMANY

The **Black Forest Hunting Knife**, made in Solingen, West Germany of superfine *Nicht Rosten* (non-rusting) steel is **NOW** available in this country! The rugged beauty of this superb knife has already won recognition for design in industrial circles on the Continent—and its utility and value as an aid in hunting & fishing has made it a prime favorite with sportsmen all over Europe! Blade is actually sharp enough to shave with; the genuine leather scabbard is metal-tipped; this knife will stand up against the most rugged treatment; 10 inches in length. Sleek, graceful lines of this new German import make it an ideal collector's item—a hunter's delight—and a dandy rec room or men's den decoration. Import supply is limited and the low 3.95 price (postpaid) means you'll have to act fast! Send 3.95 in cash, check or m.o. for prompt delivery. CODs plus fees. Your money back if you're not delighted!

THORESEN'S, Dept. 7-D-80, 352 Fourth Ave., New York 10, N. Y.
Same price in Canada. Address:
Thoresen's, Dept. 7-D-80, 45 St. James St., West Montreal 1, P.Q.

THORESEN'S, Dept. 7-D-80
352 Fourth Avenue, New York 10, N. Y.
RUSH Solingen Steel Knife on 5 Day Trial Money Back Guarantee.
☐ 3.95 enclosed—Send prepaid. ☐ Send C.O.D. plus postage.

Name _____

Address _____

Town _____ Zone _____ State _____
(Canadian orders shipped direct from Canada, duty paid. No extras! Visit us in Montreal or New York.)

ROTOMATIC "Self Propelled" ROTARY TILLER

The effortless action of this powerful tiller makes work in the garden a real pleasure. PLOWS—DISCS—HARROWS and CULTIVATES in one operation . . . QUICKLY and THOROUGHLY.

High in VALUE
Low in PRICE

Send for NATIONAL'S '54 Catalog J filled with Super Values

ONLY 99.50

- EASY STARTING 2 H.P. BRIGGS ENGINE
- FINGER TIP THROTTLE CONTROL
- UNBREAKABLE MALLEABLE STEEL TINES
- SEMI-PNEUMATIC RUBBER WHEELS

NATIONAL FARM EQUIPMENT CO., INC.
142 GREENE STREET • NEW YORK 12, N. Y.

YOU DON'T HAVE TO BE AN EXPERT TO

BUILD YOUR OWN SWIMMING POOL

You can easily construct your own swimming pool and do a professional job without any difficulties or skilled help at one-sixth the cost. Simplified plans give full and complete step-by-step building details. No professional skill required. Our plans show detailed drawings from start to finish. Many designs to choose from including Georgian, Grecian, Kidney, Oblong, Roman.

***Complete set of plans, drawings and building instructions* $20.00**

ARLAND ENGINEERING AND CONSTRUCTION
Box 254 Dept. P New Hyde Park, N.Y.

DINSMORE... AUTO COMPASS

Enjoy traveling with America's finest auto compass. Accurate—dependable—trouble-free. Quickly and conveniently mounted on any car. Always insist on a DINSMORE—It's the only compass approved by auto manufacturers. Send for free folder "Pants' Knives, Compasses" and name of nearest dealer.

TRAVELITE
Only **$5.49**
Illuminated

Guide-Way $4.95
Non-Illuminated

Dinsmore Instrument Company
1814-27 Kelso St., Flint, Mich.

CHROME "PERFECTA" BLANK PISTOL AUTOMATIC

REALLY automatic! Keeps shooting—no delays! Ejects empties automatically! Exclusive feathertouch trigger pull for youth or women. Big shots for Sports, Radio, TV Shows! Scares intruders. Chrome Finish. Special at **12.50**
REG. MODEL BLANK PISTOL, BLUE FINISH 9.95
BLANK CARTRIDGES • 100 for 1.50
ORDER BY MAIL • No Police Permit Req.
SEND CHECK OR M.O.
BY MAIL FOR MALES
GODFREY IMPORT CORP., DEPT. P-4 277 B'WAY, N.Y. C. 7

WHEELS WHEELS WHEELS

7" Disc Wheel 3/4" Tire 3/8" sleeve	45c ea.
8" Disc Wheel 1 1/4" Tire 1/2" sleeve	70c ea.
7" Disc Wheel 1" Tire 1/2" ball bearing	80c ea.
8" Disc Wheel 1 1/2" Tire 1/2" ball bearing	$1.00 ea.
6" Disc Wheel 1.50 semi-pneum. Tire 1/2" B.B.	$1.35 ea.
8" Disc Wheel 2" semi-pneum. T. 1/2" B.B.	$1.50 ea.
10" Disc Wheel 1.75 semi-pneum. T. 1/2" B.B.	$1.50 ea.
10" Disc Wheel 2.75 semi-pneum. Tire 5/8" B.B.	$3.50 ea.
12" Disc Wheel 1.75 semi-pneum. T. 1/2" B.B.	$1.85 ea.

Above wheel prices includes hub cap. Plus Postage. C.O.D.'s accepted.
AXLES—Sizes 5/16 in., 3/8 in., 1/2 in.—Cut to size—End holes drilled.

UNITED WHEEL STAMPING CO.
12131 S. PEORIA STREET PS-4 CHICAGO 43, ILLINOIS

King! **SOCKO**

SUPER SLINGSHOT

SILENT • RIFLE FAST • POWERFUL • ACCURATE

Great for small game and target shooting! 45 pound pull. Big, sturdy stock. Lively, raw rubber. Sweet shooting. Power: 50 steel balls (.25 calibre), extra rubber and target. Sent by return mail. Guaranteed. *Approved by American Small Game Slingshot Association*

SOCK-O, P. O. Box 2285, Hollywood 28, Calif.

2 OR 4 WHEEL DRIVE FOR JEEPS IN SECONDS

AMAZING WARN LOCKING HUB

gives your 4-wheel drive Willys or Dodge 2-wheel pep, power, speed, extra mileage, passenger car performance—as well as 4-wheel power and traction! Change from 2-wheel to 4-wheel or back in seconds with fingertip control. Warn hubs reduce wear on front axle assembly and front tires, eliminate shimmy, increase gas mileage to 6 m.p.g. Money back guarantee. For Willys $69.00, Dodge $74.00 pr. ppd. Warn Standard Hub for Willys $20.00 pr., Dodge $23.00 pr. and Warn Automatic Hub for Willys $129.00 pr. At Dealers or direct.

WARN MFG. CO.
RIVERTON Box 6064-B3 Seattle 88, Wash.

SAVE 75% ON

WORK CLOTHES!

SURPLUS STOCK FROM MIDWEST SUPPLY FIRM!
Terrific values you've got to see to believe!

SHIRTS 79c
Made to sell for 2.99! Now Only 4 for $2.99

What a buy! 4 for the price of one! These shirts, though used, are washed, sterilized and ready for long, tough wear. In blue or tan. *Send name, address, neck size.*

PANTS *to match* **99c**
Sold for 3.95 now only . . . . . 4 for $3.75
Unbelievable Bargains! *Send waist measure and inside leg length.*

COVERALLS . . . wear 'em used and save plenty! Originally 5.95. Now only **$1.95**
Send chest measurement. 3 for $5.75

SATISFACTION GUARANTEED! Your money back if you can beat these bargains anywhere! You can't lose so order TODAY for immediate delivery! Pay postman or send money with your order and save postage. $1.00 deposit on C.O.D. orders.

GALCO SALES CO. Dept. 244
7120 Harvard Ave. • Cleveland 5, Ohio

CUT BUILDING COSTS ⅔

Make Your Own Concrete BLOCKS and BRICKS To Use or Sell

New superior moulds make absolutely square, true, easy-to-lay blocks which will pass any building code. Production is fast . . . easy. One durable $30 machine will make four 5"x8"x12" blocks per minute—1,000 a day. Pays for itself in one day! Sell blocks for big profit . . . or save ⅔ building cost for yourself. POST CARD BRINGS FREE FOLDER.

ECONOMY MFG. CO.
DEPT. S STONE MOUNTAIN, GA.

Prints Postal Cards!

FREE Use on 30 Day Trial! Send name today for facts and FREE Illustrated Book of unique advertising plans and money-making ideas for your business. Learn how others are boosting sales with post card ads . . . easy with Cardmaster.

Cardmaster Co., 1920 Sunnyside, Dept. 1644, Chicago 40, Ill.

MODERN
LAWN MOWER SHARPENER

Service departments of leading Lawn Mower manufacturers use the Modern Lawn Mower Sharpener. One lever moves lawn mower into grinding position. Gasoline and oil remain in engine while sharpening, no dismantling of wheels, roller or handle. The Modern is a precision bed knife grinder—no extra grinder to buy. Imitated but never equaled—Compare before you buy.

WRITE FOR FREE BOOKLET 11D

$263.00 with motor F.O.B. PASADENA

If it isn't a Modern it can't be Modern

(Prices subject to change without notice)

MODERN MFG. CO.
160 N. Fair Oaks • Pasadena 1, Calif.

So easy to have the windows you want with the NEW CURTIS CONVERTIBLE

Here's the most amazing window you've ever seen! The new Curtis Convertible wood window can be used as an awning—casement—hopper-type sash—in more than a thousand different combinations! And the Curtis Convertible is so easy to install! It's completely factory assembled with basic frame, operating hardware, sash, screen and insulating light. Low in cost, the Curtis Convertible is fully guaranteed as to materials and workmanship.

Here the Curtis Convertible is used as a casement.

Ideal for use as awning style window.

Ventilation at floor level with hopper-type window.

Sold through retail lumber dealers everywhere.

CURTIS WOODWORK SILENTITE the Insulated window

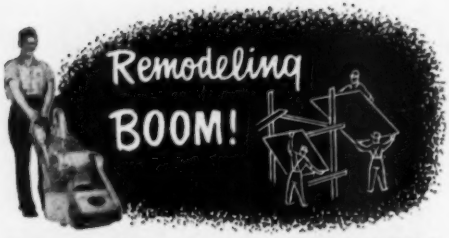
PS-4
Curtis Companies Service Bureau
200 Curtis Building
Clinton, Iowa

Please send literature on Curtis Convertible windows and other Silentite window styles.

Name.....

Address.....

City.....*Zone*....*State*.....



Your Big Opportunity to enter FLOOR SURFACING PROFESSION as YOUR OWN BOSS at BIG PAY!

Twenty million dwelling units need remodeling and repairs including resurfacing of old worn floors. Also, new construction continues to boom. This means a lifetime opportunity to establish yourself in a fine business that pays you well . . . sanding floors with an easy-to-run American machine! Steady year 'round work where profits are limited only by the time you spend. Full or part time opportunities. No schooling or special skills required. Only small investment in sander gets you started. Send for booklet "Opportunities in Floor Surfacing," enclosing 25c in coin or stamps to cover handling.

SEND . . AMERICAN
FLOOR SURFACING MACHINE CO.
532 So. St. Clair St., Toledo 3, O.

YOU can improve . . . protect . . . beautify . . . your home

with everlasting *Alumatic*
ALUMINUM WEATHER CONTROL PRODUCTS

Alumatic products never rust or rot — seldom need repair, *always* look beautiful. Once they're up — they're up for good — your good!

ALUMINUM COMBINATION WINDOWS
No changing or storing with 3 TRACK operation plus Velglidel Insulate — protect year 'round.

ALUMINUM COMBINATION DOORS
Storm door in Winter, Screen door in Summer
Enduring beauty and protection for every home.

ALUMINUM AWNINGS and CANOPIES
Full ventilation, exclusive "Magic Light", modern horizontal lines and bright rainbow colors!

Alumatic products are easily and quickly installed.

write for folders and your dealer's name. ▶ **Alumatic Corporation of America** Dept. C64D, Milwaukee 14, Wisconsin **Alumatic of Canada, Ltd.**, Windsor, Ont.

Tiny Telescope
ACTUAL SIZE PHOTO

ONLY $3.95 TAX FREE
Gives "CLOSE-UPS" from MILES AWAY!

A powerful telescope yet the size of your thumb! Conceals completely inside palm of hand! A revolutionary German made optical achievement. Precision easy-slide operation. Scientifically ground lens provide Brilliant Illumination, sharp detailed images. Lustrous ALL CHROME with black trim. An all purpose performer . . . Instant focusing from 2 feet to infinity! **NOT A TOY**; a precision made instrument.

No Risk TRIAL OFFER

If not 100% satisfied after 10 Day Trial return for full refund. Cash orders $3.95 postpaid. (C.O.D.'s $4.51) **UNITED BINOCULAR CO., 9043 S. Western, Dept. PT-103, Chicago 20. DEALERS WANTED.**

BUILD LUGGAGE AT HOME WE SELL YOUR PRODUCTS!

Only New Home Money-Making Plan in Years!

Make Luggage and cases for traveling, photographers, musicians, salesmen, electronics, tools, portables, 1001 other items. Also repair Luggage. No special equipment needed. BIG Profits. We supply complete instructions—everything. Write for free details and Business Plan. ABARSI CASECRAFT Dept. C9, 805 W. Sunset Blvd., Los Angeles 12, Calif.

LEARN LOCKSMITHING

Learn this fascinating, profitable trade from experts in your spare time at home!
Age or physical handicap no disadvantage. Year around, steady income. Full or part time. Practical, illustrated lessons. You can make money even while learning! All materials and special tools supplied without extra charge.

LOCKSMITHING INSTITUTE, Dept. PS-53
15 PARK AVENUE RUTHERFORD, N. J.
Lic. by N. J. State Board of Education
Approved for Veterans

BUY IT **WHOLESALE!**

GET UP TO 40% OFF

☆ Start a Buying Service at Home, SPARETIME. GET BIG-NAME MERCHANDISE FOR SELF AND CLIENTS UP TO 40% LESS THAN REG. PRICE. SALES EASY, AS YOU CAN GIVE SIZEABLE DISCOUNTS. STILL MAKE FAT COMMISSIONS. *Post Card brings FREE COPY "The Wholesale Plan".*

FREE! "THE WHOLESALE PLAN"

American Buyers Service

■ 631-SP LINDEN AVE., BUFFALO 16, N. Y. ■

Genuine Dupont Plastic NEW FALSE PLATE

From Your Old, Loose Plate NO IMPRESSION NEEDED
New, revolutionary Duplication System actually transforms your old, loose, cracked, chipped plate into a new, natural-pink Dupont Plastic Plate with same teeth or new, natural matched teeth. ONE DAY SERVICE!

Only $18.95

30-DAY MONEY-BACK TRIAL

SEND NO MONEY—just your name and address for **FREE** details. Save at our low price! Highest prices paid for Dental Gold. **ALL-STATE DENTAL LABORATORIES, 22 W. Madison, Dept. 407, Chicago 2.**

Wanted New *Writers*
of Stories, Mysteries, Articles Plays

Would you spend a few hours a week learning to write so you may earn $300-$1200 a year part-time? Or many thousands full-time? Free book, "Art of Writing Salable Stories" shows how you can earn while learning (A. L.'s first story brought $110), how home-study method gives you thorough, professional training, advice of world-renowned authors such as Rupert Hughes, Katherine N. Burt. Write today for free book! Clip this reminder ad!

BARTON A. STEBBINS—(President)
PALMER INSTITUTE OF AUTHORSHIP, Founded 1917
1680 N. Sycamore, Hollywood 28, California. Desk U-44

WHY PAY MORE? Family-safe Partially-used **TIRES (NOT RECAPS)**
Month After Month. For Years. You See Our Ad.

FREE This Pictured Tire Ash Tray with your name with two or more tires

Car Tires $3 (20 Mo. Guar.) Truck Tires $11

TAKE 10% DISCOUNT
GOODYEAR, FIRESTONE, GDCH, U.S. & OTHERS.
FINEST GRADE

AMERICA'S MOST RESPECTED GOLDEN-RULE GUARANTEE

32 Mos. or 50,000 Miles

FREE REPLACEMENT IF DEFECTIVE
34 Mos. or 55,000 Miles
Tough, Rugged truck Tires
6-8-10-12-14-Ply Tires

600-16	$5.14	640-15	$4.84	750-15	$10.84	32x6(10)	$13.14
600-16(6)	6.64	670-15	5.24	825-15	11.04	750-20	13.24
650-16	5.64	710-15	5.34	750-16(8)	9.34	825-20	17.74
650-16(6)	7.14	760-15	5.84	700-17	8.94	900-20	17.84
700-16	6.24	800-15	6.24	750-17	11.84	1000-20	16.84
700-16(6)	7.24	820-15	6.24	600-20	8.24	1100-20	17.84
750-16(6)	8.34	650-15	5.14	650-20	9.74	1200-20	18.84
550-16	4.44	700-15	5.24	700-20	10.74	1000-22	18.04
550-17	4.44	525-18	4.00	32x6(8)	10.74	1100-22	18.04
475-19	5.34	500-20	4.44	WHITEWALLS $1 EXTRA			

MILITARY MUD-GRIP TIRES (Not Retreads)
750-20 Super 20 Mos $12.22 Rugged 34 Mos $14.44 900-16 Super 20 Mos $12.22 Rugged 34 Mos $14.44

MUD-GRIP TIRES any car size **$7** Guar. 32 Mo.

"I have personally pinpoint inspected every tire, as if our very future depended on it. There's not 1 tire here I wouldn't use myself. I ask one chance to treat you right." Mort Blatt, Mgr.
—Faithfully serving motorists, hospitals, schools & churches since 1917.

BLATT Phila., Pa., 11th and Spring Garden St.
Miami, Fla., 2827 N.W. 7th Ave.
Order from our nearest store. Send Ck. or M.O. & this ad.
—Thousands of shipments Rushed all over the world.

BOAT OWNER!

- ***Permanently LEAK-PROOF Your Boat!***
- ***No more annual Painting, Caulking.***

Apply Liquid Plastic and Glass Fibers. ONCE ON, STAYS ON. Easy to use; economical. Send for handbooks: *"How to Make Your Old Boat New"* and *"How to Build Your Own Fiberglass Boat."* Both for 25c. Satisfaction guaranteed. (*Bona Fide Dealers Invited.*) **Marine Div., Dept. MD-2.** **25¢**

CASTOLITE CO., WOODSTOCK, ILLINOIS

STRATEX **DRAFTING FURNITURE FITS TIGHT BUDGETS!**

It costs less to buy the best when you buy direct! Guaranteed Stratex equipment fits any wallet, any space, any requirement — lovely to look at too! Free data.

STRATEX INSTRUMENT CO., INC.
1861 L HILLHURST, LOS ANGELES 27, CALIF.

DON'T BE CAUGHT WITH A DEAD BATTERY

Amazing "New Life" battery rejuvenator stops build-up of plate sulfates . . . keeps battery automatically charged. Use lights, heater, radio, as much as you like. Get faster starting! Greater power! *RECHARGING IS UNNECESSARY!* Only one treatment needed! Money back guarantee. Rush $1.00 to:

J&M PRODUCTS CO. • 1118-F Castleton Rd., Cleveland 21, OHIO

Here now for 1954

A beauty to see . . . a breeze to move . . . a bargain to own! The HOWARD all-steel insulated mobile home, time-tested from Alaska to Florida, now better by a lifetime of living improvements! For details write: HOWARD Industries, Box 2188—Dept. 36—Saginaw, Mich.

Howard MANSION COACH
HOWARD INDUSTRIES INC. SAGINAW MICHIGAN

PROVEN by PERFORMANCE

From the sandlots to the majors . . . in game after game and season after season . . . performance proves Louisville Sluggers are the world's finest bats. Your dealer has autographed models of Baseball's greatest players — see him!

THIS YEAR BOOK
FREE at your dealer's or send 5c in coin. Print name and address plainly. Softball Rule Book also available 10c per copy. Address Hillerich & Bradsby Co., Louisville 2, Ky. Dept. PS.

LOUISVILLE SLUGGER BATS

LOUISVILLE SLUGGER PEN-PENCIL SET 45c per set

LOUISVILLE SLUGGER MINIATURE BAT (16" long) 45c each

LOUISVILLE SLUGGER HILLERICH & BRADSBY CO. LOUISVILLE 2, KY.

HILLERICH & BRADSBY CO., Louisville 2, Ky., Dept. PS
Please send me_____Pen and Pencil Sets @ 45c each.
_____Miniature Bats @ 45c each.
NAME_____
ADDRESS_____
CITY and STATE_____

AT

NORTHROP AERONAUTICAL INSTITUTE

Because WE HELP YOU

by low tuition cost • by easy pay plan • by intensive, shorter courses • by assisting you to get good paying part-time work • by helping to place you after graduation. NOTE: The Demand for Northrop Graduates exceeds the supply.

MAIL COUPON FOR FULL INFORMATION

NORTHROP AERONAUTICAL INSTITUTE 9N17
1125 W. Arbor Vitae Street, Inglewood 1, California
Please send me immediately the Northrop catalog, employment data and schedule of class starting dates. I am interested in:
- ☐ Aeronautical Engineering Technology
- ☐ Aircraft Maintenance Engineering Technology
- ☐ Master Aircraft and Engine Mechanic
- ☐ Jet Engine Overhaul and Maintenance

Fully approved Veteran training

Name ..... Age .....
Address .....
City ..... Zone ..... State .....
Veterans: ☐ Check here for Special Veteran Training Information

I call this machine "my little money maker"

You can put it anywhere—kitchen, attic, basement. It makes money for you while you're at work, asleep or at the movies. It turns out a product that sells for $6.00. Materials cost you only 54c. So you make more than $5.00 on each one. No house to house selling. I show you how to get orders by mail or through neighborhood stores. Millions of mothers everywhere want their baby's first shoes "Bronzed." The demand is increasing all the time. And it's so easy to metalize baby shoes at home, in spare time, while you keep your present job. It's the kind of work the whole family will have fun doing. The information I send you tells how you can get one of these "little money makers" too. There is no cost or obligation. So send a note or a postcard to me, John G. Mason, 1512 Jarvis Avenue, Chicago 26, Illinois and I'll send all this money making information by return mail, free and postage paid. Write to me right away so I can show you how to get started making as high as $10 an hour in your spare time.

MODEL MINIATURES
Real Collectors' Items

Authenticast

Accurately scaled, precision detailed AUTHENTICAST models of actual combat tanks, ships and planes.

Welcome additions to every collector's shelf.
Send for fully illustrated new, Authenticast Catalogue—Vol. IV. 35c.

COMET METAL PRODUCTS CO. INC.
Richmond Hill, 18 New York, N. Y.

BATTERIES START A FACTORY AT HOME

maintain, rebuild—and re-cast junk batteries into new, with and without new materials; the latest achievement. We supply complete instructions and everything needed. Large daily profits.

BATTERY LABORATORIES
DEPT. PSM, MINNEAPOLIS 4, MINNESOTA

LEARN AIR CONDITIONING

Home Air Conditioning is here! Trained men needed. Excellent wages, steady work. Install and service units, start your own business, or save hundreds of $$$ learning how to air condition own home. New Manual course "YEAR ROUND AIR CONDITIONING" complete in 1 volume. Write

DON H. GARDNER, P.O. Box 4287, PHILADELPHIA 44, PA.

ANALYZE HANDWRITING

MORE INCOME... MORE PRESTIGE AND MORE SUCCESS!

FASCINATING, uncrowded profession - business, full or spare time. Free illustrated lesson and yearbook shows how men and women in home and business find opportunity in analyzing handwriting. *Understand People—Make Money.* Free lesson and information about amazing opportunities if over 21.

I. G. A. S., Inc., 900 Wilhelt Building, Springfield, Missouri

Build your own *JET ENGINE!*

Order these plans today

1. JET PROPELLED BICYCLE. Assemble your own. Photo and instructions $1.00.
2. HOW TO MAKE EXPERIMENTAL JET ENGINES. Seven sheets drawings with information and instructions $2.95.
3. BOTH OF ABOVE in one order $3.75.

SEND NO MONEY. Order both at once $3.75 C.O.D. in USA plus c.o.d. postage. Send check or Money Order and we pay postage. Get other information too. Rush Order.

J. HOUSTON MAUPIN, Dept. 66, Tipp City, Ohio

I'll Send You This Handsome SAMPLE CASE-FREE

and Show You How to Make Up to $15.00 in a Day

WRITE for this FREE Tailoring Sample Case packed with 150 beautiful, big-value suit and overcoat fabrics. Take orders from friends, fellow-workers, others, for fine quality, made-to-measure clothes. Pocket big cash profits in advance. Because wearing our suits and overcoats brings more orders, we make it easy for you to get your own clothes without 1c cost. No experience is needed. SATISFACTION GUARANTEED. SEND NO MONEY. Rush your name, address, and age—today!

J. C. FIELD & SON, INC., Harrison & Throop Sts.
DEPT. J 1720 CHICAGO 7, ILLINOIS

LINGUAPHONE for LANGUAGES

Learn another language **AT HOME** as easily, naturally as you learned English long before you went to school. It's like living in another land. With **Linguaphone, World's Standard Conversational Method,** you **LISTEN**—you hear native men and women speak with a 1954 vocabulary—YOU understand—**YOU SPEAK**—You learn to read and write.

French Spanish Italian
Russian Japanese German
Portuguese
—29 Languages available

Used internationally by schools, colleges, governments and business firms. Over a million home-study students of all ages. Send for FREE BOOK, "Passport to a New World of Opportunity."

LINGUAPHONE INSTITUTE
147-04 RCA Building N. Y. 20, N. Y.
Leaders for 50 Years in Up-to-Date Language Courses

PUMP WATER *FAST!*

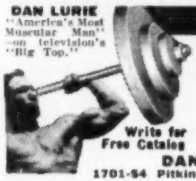
DRAIN WASH TUBS, CELLARS, CISTERNS. Famous #7 pumps 2800 GPH. 420 GPH at 75' high or 1600 GPH from 25' well. Sturdy, rustproof Alloy Metal. Six Blade impeller. Uses any ¼ to ½ H.P. Motor. Will not leak or clog. Fits any garden hose. Immediate money back guarantee. Send Check, Money Order, or C.O.D. . . . . $8.95 IN U.S.

IRRIGATE, FILL TANKS, DRAW WELL WATER. Heavy duty #8 Pumps 7000 GPH. 1000 GPH 75' high — 3000 GPH from 25' well. Rustproof Alloy Metal. 8 blade impeller. 1" inlet — 1" outlet. Standard Pipe Threaded. Money back guarantee. Send check, Money Order, or C.O.D. . . . . $11.95 IN U.S.

Free Catalogue — Gear Pumps — Deep and Shallow Well Pumps.

MOORE MANUFACTURING CO.
SWEDESBORO 13 NEW JERSEY

DAN LURIE
"America's Most Muscular Man" —on television's "Big Top."



FAMOUS DAN LURIE
BARBELLS
with 4 courses—low factory prices

50 lb. set...$ 8.48	150 lb. set...$20.48
100 lb. set... 13.98	200 lb. set... 25.98

Order by Mail; 50% with order, bal. C.O.D. Extra wts. 13c per lb., F.O.B. plant

Write for Free Catalog

DAN LURIE BARBELL CO.
1701-54 Pitkin Ave., Dept. 470 D. Brooklyn, N. Y.

WOODCRAFTSMEN'S
144 page
ENCYCLOPEDIA 15¢

Bargain book of every conceivable woodworking item and tools. Full of How-To-Do-It information, illustrations, projects and ideas. Domestic and imported woods, inlays, panels, etc. Send for your copy today. Biggest 15c worth ever offered.

CRAFTSMAN WOOD SERVICE CO.
Dept. B-4-F, 2729 S. Mary Street, Chicago 8, Illinois

ELECTRIFY your SEWING MACHINE

NEW LOW PRICE! **$9.95** 1 YEAR GUARANTEE

Buy direct from manufacturer and save! Kit comes fully wired, installed in a jiffy. Fits all machines! You get **ALL-NEW PARTS**

- Motor & Bracket
- AC-DC 115v 60c
- Multi-speed foot control
- Cord set & block
- Easy instructions
- Steel pulley & belt

FREE . . . reg. $2.95 chrome SEWLITE given with every kit.

10 DAY FREE TRIAL—ORDER NOW!

Send no money, pay C.O.D or send money order and we'll pay postage. Please state whether wheel on your machine turns toward you or away from you. Shipping wt. 6 lbs.

SENIOR SEWING MACHINE CO.
Box 147 PS 56 Brooklyn 6, N. Y.

NOW! CONVERT YOUR BRAKES TO

TOUCH-O-MATIC HYDRAULIC
Power Brakes!
"MILLION-MILE" PROVEN
With New DO-IT-YOURSELF CONVERSION KIT!

FITS ALL CARS! (New or Old). Trucks and busses too. ANY MAKE of car—ANY MODEL, whether you own a 1930 Vintage or a brand new 1954. Now you can bring your old car up to date or save money by installing Power Brakes in your new car.

INSTALL IT YOURSELF IN 30 MINUTES. It's easy! NO EXPERIENCE is needed—NO SPECIAL TOOLS are necessary. All you do is follow simple step-by-step instructions, (or any garage will install for you for only a few dollars.)

AT LAST! POWER BRAKES FOR YOUR CAR AT A PRICE YOU CAN AFFORD! Previously Power Brakes have been available *only* on some new model cars. If you purchase a new car with this wonderful, new convenience, you'll pay up to $85.00 EXTRA for them. But now you can enjoy Power Brakes at a fraction of this price. Add to your car's resale value!

WHAT POWER BRAKES MEAN TO YOU! No more "slamming" on brakes—now get smoother, safer, faster brake action. Power Brakes double braking power with ½ the effort, give you better control and skid-prevention on rough or wet roads. (Tests prove you stop 26.6 ft. sooner at 40 mph.) A miracle new automotive advancement for any one who drives a lot—a fine new convenience for women drivers.

PAYS FOR ITSELF IN ONE YEAR! It's a fact! Touch-o-Matic Hydraulic Power Brakes equalize braking power on all wheels, thus increasing brake life up to 65%. Tire mileage, too, is substantially increased. Yes, Power Brakes actually pay for themselves.

BRAKE-O-MATIC POWER BRAKES USED ON POLICE, FIRE, AND EMERGENCY VEHICLES. Many city municipalities have chosen to use the proven "Million Mile," Time Tested, Touch-o-Matic Power Brakes OVER ALL OTHER MAKES selling for much more. They realize the Safety and Dependability of Hydraulic Power Brakes. Now you, too, can enjoy the Touch-o-Matic SMOOTHER AND EASIER CONTROL in your own car and SAVE! SAVE! SAVE! at a special, low introductory price.

SPECIAL
INTRODUCTORY OFFER!
$19.95 Complete Postpaid
(Light trucks, $24.95, 1½ and 2 ton Trucks, $36.75)

DEALERSHIPS AVAILABLE! Appointments now being made

COMPLETE POWER BRAKE CONVERSION KIT INCLUDES:

Touch-o-Matic compact Power Unit and all fittings necessary for easy, fast installation. Also included is illustrated, step-by-step installation instructions.

MAIL THIS COUPON TODAY!

Continental Engineering Prods., Inc. Dept. A-4
10418 Venice Blvd., Culver City, California

Rush _____ Power Brake Kits to me at Special Introductory Price. I understand that I will also receive your full 8 year guarantee of complete satisfaction.

Make of Car _____ Year _____ Model _____

☐ I enclose $19.95 ($24.95 or $36.75 for trucks). Ship everything to me POSTPAID.

☐ I enclose $5.00 deposit, will pay balance and shipping cost C.O.D.

Name _____

Address _____

City _____ Zone _____ State _____

DIESEL MECHANICS NEEDED

BIG PAY—GOOD FUTURE

Virtually all heavy power equipment is rapidly going DIESEL, creating big paying, steady jobs—through good times or bad—for properly trained men.

Back during the DEPRESSION . . . there was a *big demand* for Bailey Trained Diesel mechanics.

We can QUICKLY TRAIN YOU to enter this big pay field . . . no previous experience or special education necessary!

With our method of training you don't spend years pouring over books, figures, charts or graphs —you learn by repairing and operating big Diesel engines, under the guidance of experienced and friendly instructors.

This method of training gives you the experience and confidence that enables you to move right into the BIG PAY JOBS without spending years as a mechanic's helper. We help you find part-time jobs while in school—full-time jobs after graduation. Mail coupon for complete information.

BAILEY Technical SCHOOLS

Veteran Approved

1632 S. Grand St. Louis 4, Mo.

NAME.....AGE.....

STREET.....

TOWN.....ZONE.....STATE.....

Shrinks Hemorrhoids Without Surgery

Science Finds Healing Substance That Relieves Pain—Shrinks Hemorrhoids

Science has found a healing substance that shrinks hemorrhoids, stops pain promptly, ends bleeding — without surgery. Doctors report actual shrinking of hemorrhoids. Sufferers say, "Hemorrhoids have ceased to be a problem." The secret is Bio-Dyne® — already widely used for healing injured tissue. This substance is now available in a hemorrhoid ointment called *Preparation H**. Ask your druggist for Preparation H. Money back guarantee.

*Trade Mark

EYE GLASSES by MAIL As low as $1.95

WRITE for FREE CATALOG with 14 LENS SAMPLE CARD

Thousands of Customers Est. 1929

QUALITY READING MAGNIFYING OR BIFOCAL GLASSES FOR FAR AND NEAR

ADVANCE SPECTACLE COMPANY, Inc.

537 S. Dearborn St., Dept SP-4 Chicago 5, Illinois

FREE 1954 CATALOG

WORLD RADIO LABORATORIES

"The World's Largest Distributor of Amateur Radio Transmitting Equipment."

Jam packed with bargains — everything in Radio, TV, and Hi Fi — for Handyman, Ham, Experimenter or Serviceman!

- Pay Only 10% Down
- Easy Terms
- Liberal Trade-Ins
- Save Over 50% on Used Equipment
- Over 600 guaranteed reconditioned items.

Leo I. Meyerson

WORLD RADIO LABORATORIES

3415 W Broadway — Council Bluffs, Iowa

PERSONALIZED SERVICE

MAIL HANDY COUPON

WORLD RADIO LABORATORIES, INC. Dept. PS-4
3415 W. Broadway — Council Bluffs, Iowa

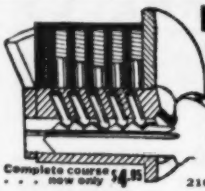
3¼x4" U.S.

☐ Free 1954 Catalog ☐ Used Eqp't List ☐ Radio Map 25¢

NAME_____

ADDRESS_____

CITY_____STATE_____



Locksmithing AND KEY MAKING

Now Made Easy! Practical up-to-date course teaches you how to pick locks, de-code, make master keys, repair, install, service, etc. New self-instruction lesson for every handyman, homeowner, carpenter, mechanic, service station operator, fix-it shop, hardware dealer, gunsmith. 53 easy illustrated lessons. Full price only $4.95, postpaid; or C.O.D. plus postage. Satisfaction or refund guaranteed.

Complete course $4.95 now only

Nelson-Hall Co., Dept. DW-1
210 S. Clinton St., Chicago 6, Ill.

YOU CAN FIND

GOLD - SILVER - TREASURE

with our new, super-sensitive Metal Detectors. New, field-proved Geiger Counters for uranium. Mineralights for Tungsten. Free Information.

THE DETECTRON, CORP. Dept. PS-7

5420 N. Vineland, N. Hollywood, Calif.

SEA LEGS PRICES from $39.00

QUALITY BOAT KITS F. O. B. DEFIANCE, OHIO

12' UTILITY 14' RUNABOUT 8' SKIFF

PENNEY WOODCRAFT INDUSTRIES

1301-09 Ottawa Ave., Dept. 4-P Defiance, Ohio

You Can Be a Local Manufacturer of CAVITEX

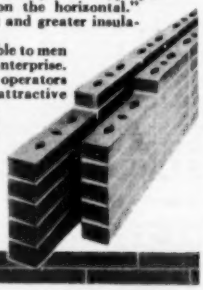
X4

Superfine Masonry

Local production explains why Cavitex can offer so much in quality for so little money, yet is so generous in profit potentials. It's a case of streamlined manufacturing—processing local materials for local building—cutting out the high costs of freight and distribution.

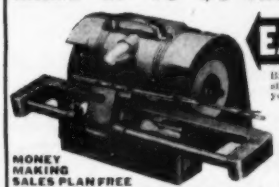
Cavitex creates new standards of beauty—in size, proportion and color. "Puts emphasis on the horizontal." Cored-out design for lighter weight and greater insulation values.

Hundreds of territories are available to men looking for a local manufacturing enterprise. Franchise privileges. Responsible operators can obtain basic equipment on attractive rental terms. The Cavitex industry is sponsored by a million-dollar company backgrounded by fifty years of experience and reputation. Write or wire at once for "Opportunity, Unlimited."



W. E. DUNN MFG. CO.
410 W. 24th St., Holland, Mich.

MAKE UP TO $5 AN HOUR WITH EASISHARP



MONEY MAKING SALES PLAN FREE

Big profits in your spare time sharpening scissors. We show you how to start making money immediately. This is your chance now to have your own business and a steady income. Sharpen a pair of scissors in less than two minutes! A child can operate it. Weighs only 10 lbs. Every home, barber, tailor, dressmaker—everybody uses scissors and all need sharpening two to four times a year. Don't let some one else beat you to this opportunity. Write immediately to

SERR-EDGE MACHINE CO., 9733 Lorain Ave., Cleveland, Ohio

Also Eshelman **SPORT CARS**

WORLD'S LOWEST PRICE

70 Miles Per Gal. Holds 1 Adult. Free Literature

RAKES
PLOWS
CULTIVATES
HARROWS
HAULS
SPRAYS
SAWS
DOZER
MOWS
CUTS
ROLLS
TILLS
SNOW PLOW

Low as $69 PLUS TOOLS

ESHELMAN FOR BETTER LAWNS and GARDENS

Also Power Reverse. Women Can Operate It. Free Catalog. Write:
ESHELMAN, Dept 44
119 Light St., Balto. 2, Md.
333 N. Michigan Ave., Chicago-1, Ill.
7070 Hollywood Blvd., Los Angeles 28, Cal

GUNS
12 MODELS "AUTHENTIC REPLICAS"

START YOUR COLLECTION TODAY!

Colt Cobra .38

Collection includes:
Russian Tokarev
German Luger
Czechoslovakian Pistol
Italian Brevettata
German Mauser
Japanese Nambu
Spanish Moxley
Belgium Automatic
German P-38
Frontier .44 Colt
Colt .45 Automatic

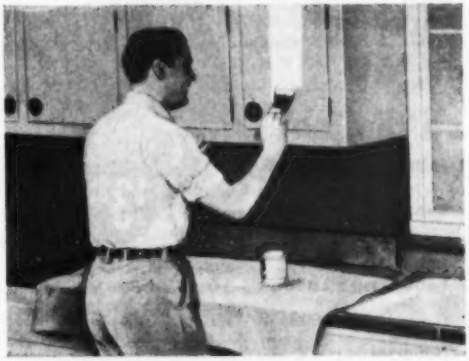
- **Reproduced in Actual Size, Design and Balance.**
- **Made of Solid Cast Aluminum**
- **Finished in Gun Metal Black**
- **"He-Man" Trophies for Den, Rumpus Room, Cabin, Etc.**

Send Cash, Check or Money Order
(In Calif. add 3% Sales Tax)
Sorry. No Canada Orders or C.O.D.'s

ONLY **$2.00** each postpaid

LYTLE NOVELTY CO.
2656 Fashion Ave. **Long Beach 10, Calif.**

Lay on enamel fast and smooth...



HERE'S HOW: On cabinets, table tops and small flat surfaces, start from center and work out. Flow enamel off brush rapidly, avoiding overlaps. Do the sides last. Select the right-sized brush for the job and, most important, always...

Use brushes with bristles of Du Pont TYNEX nylon

TRADE-MARK

On *every* painting job, you'll find work-saving advantages in paintbrushes with bristles of "Tynex." Whether used on inside woodwork or outside clapboard, you can count on Du Pont "Tynex" nylon bristles to pick up a full load of paint, flow it on smooth as satin. Bristles of "Tynex" clean easily in any commercial cleaner. And they last 3 to 5 times longer than other types of bristles.

So look for the trade-mark "Tynex"—on tags and brush handles. Then you can be sure you're getting genuine Du Pont nylon bristles that carry the Good Housekeeping Guaranty Seal.

"Tynex" is the new trade-mark for genuine Du Pont nylon bristles

LOOK FOR 'TYNEX' WHEN YOU BUY BRUSHES

DU PONT

Better Things for Better Living ... *through Chemistry*

s, doors Floors Walls

"I saved $60 on the job"

says Mr. Robt. T. Kenney

THAT WAS the price his carpenter had quoted to reconstruct and refinish walls for a bedroom. Worth saving, by doing it yourself? You can; just use this book.

1600 OTHER JOBS are equally easy when you follow the pictures and step-by-step instructions in "Better Homes Handyman's Book." Written entirely by practical men who have done every job themselves.

THE COST of this book can be saved in the first job you tackle. It is *guaranteed* to save you money or your *entire* purchase price will be refunded.

BETTER HOMES & GARDENS
411 Meredith Bldg., Des Moines 3, Iowa

I enclose ( ) check ( ) money order for $3.95 (In Canada, $4.50) for my Better Homes HANDYMAN'S BOOK.

Name_____

Street_____

City_____ State_____

NEW *Transveneer*

PLASTIC VENEER

★

Makes any smooth surface look like WOOD, MARBLE, or LEATHER!

✓ **Refinish Old Furniture Like New!**

✓ **Finish Unfinished Furniture!**

Miraculous new veneer applies as easily as a decal. Choice of world's richest wood grains, marbles, leathers. Permanently covers any smooth surface—wood, metal, glass. Dries fast. Inexpensive.

FREE SAMPLE! *Write today for free sample and folder in full color showing TRANSVENEER selections.*

Transveneer SALES CO.
125 W. Hubbard St.
Dept. TV-34-A, Chicago 10, Ill.

LOW OVERHEAD—LARGE VOLUME SALES & SMALL PROFITS BRING YOU THESE "LOWEST PRICES" WINTER SPECIALS—WHAT GOOD IS A TIRE WITHOUT A TUBE?

TUBE FREE WITH EVERY TIRE AT NO EXTRA COST

An established Policy of Careful selection, assures you many happy miles. Be wise—try one—you'll buy More! We welcome competition. NO ONE can touch our quality & price! 20 YEARS AT THIS ADDRESS

WHY PAY MORE?—AT LOW PRICES

GOOD USED TIRES NOT RECAPS SEND THIS AD

YOU GET WHAT WE ADVERTISE

EVERYBODY MAY TAKE **10% off** ON EVERY TIRE

20 MONTHS WRITTEN GUARANTEE

600-16	$4.25	820-15	$4.85	600-20	$6.55	32x6(8)	$8.05
650-16	4.05	700-15	3.85	650-20	7.05	32x6(10)	9.05
700-16	4.35	670-15	3.85	700-20	7.85	900-20	13.25
650-15	3.85	710-15	4.25	750-20	7.85	1000-20	13.25
760-15	4.35	550-17	4.55	825-20	12.85	1100-20	13.25

Specialists in Truck Tires—Selected for Toughest Jobs—Tops in Value

EXTRA SPECIAL—30 MONTH WRITTEN GUARANTEE—FREE TUBE

600-16	$5.15	475-19	$5.35	700-15(6)	$8.55	700-20	$10.75
600-16(6)	6.65	640-15	4.85	750-16(8)	9.35	750-20(10)	16.85
650-16	5.65	670-15	5.25	700-17	7.75	750-20(8)	13.25
650-16(6)	7.15	710-15	5.35	750-17	10.85	825-20	17.75
700-16	6.25	760-15	5.85	750-15	10.85	900-20	17.85
750-16(6)	8.35	800-15	6.25	825-15	11.05	1000-20	16.85
550-18	4.85	820-15	6.25	600-20	8.25	1100-20	17.85
550-17	4.65	550-15	5.25	650-20	9.75	1000-22	18.05
650-15	5.15	670-16	5.05	32x6(8)	10.75	1100-22	20.15
700-15	5.25	700-16(6)	7.15	32x6(10)	13.15	1100-24	20.55

ALL WHITE WALLS $1.00 EXTRA (Military Treads) 750x20 $14.05

Thousands of tires shipped all over U. S. A. All tires shipped F.O.B. Phila. Send Check or M.O. with this ad. Dept. S.

STANDARD 834 N. Broad St., Philadelphia 30, Pa.

AMAZING NEW POCKET SIZE RADIO

Really Works—Small as a Pack of Cigarettes!

FITS IN ANY POCKET OR PURSE—GETS LOCAL RADIO STATIONS WITH CLEAR BELL-LIKE TONE—NO STATIC OR INTERFERENCE! NEEDS NO TUBES, BATTERIES OR COMPLICATED HOOKUPS! NO AC PLUG INS! Nothing to wear out. Thousands of users—many report years of service. Uses new crystal diode and HI-Q coil. SELF-CONTAINED SPEAKER PHONE. Just the tiny radio to take with you ANYWHERE YOU GO—ON TRIPS, VISITING, ETC.—for real fun and enjoyment—ANYTIME. **SEND ONLY $1.00** (bill, ck., mo.) and pay postman $3.99 C.O.D. postage or send $4.99 for p.p. delivery. COMPLETE READY TO LISTEN.

MIDWAY CO., Dept. PPS-4, Kearney, Nebr.

EASY TO LEARN CODE

Learn or increase speed with an Instructograph—the Radio-Telegraph Code Teacher that takes the place of an operator-instructor and enables anyone to master code without further assistance. Available tapes from beginners alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready—no QRM. Thousands have "acquired the code" with the Instructograph System. Write today for convenient rental and purchase plans.

INSTRUCTOGRAPH COMPANY
4701-P Sheridan Road, Chicago 40, Illinois

Some Good Distributor Territories Still Open

LIFE-LONG 10 YEAR BATTERIES

See our ad page 45, March issue of Popular Science. Write, wire or phone Life-Long Battery Mfg. Corporation, Dept. S-4, 11766 West Pico Blvd., Los Angeles, 64.

RUPTURED

Modern NON-SURGICAL Treatment Completely Heals Most Reducible Ruptures WITHOUT SURGERY or Hospitalization

These **Non-Surgical** treatments are so certain, that a Lifetime Certificate of Assurance is given. Hundreds have been successfully treated here the past few months. Write today for our New FREE Book that gives facts that may save you painful and expensive surgery, and tells **how non-surgically** you may again work, live, play and love and enjoy life in the manner you desire.

Excelsior Hernia Clinic Dept. 3703, Excelsior Springs, Mo.

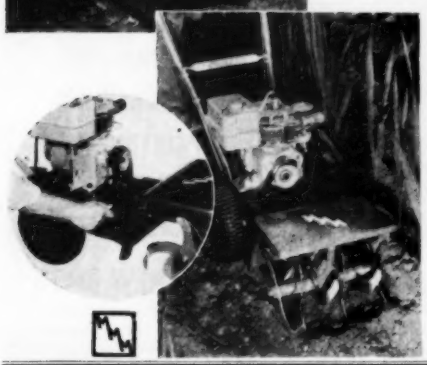
FROM Mowing TO Tilling...

IN LESS THAN 1 MINUTE WITH Triple-M QUICK-HITCH LOCK

For all-around, year-around ease, utility and economy, see Triple-M garden and yard equipment. In less than a minute, you can attach tiller, mower or snow thrower to your Multi-Purpose Power Unit, and you're ready for any kind of work. You just release the QUICK-HITCH LOCK to remove one unit; then roll in another; couple it; tighten lock by hand and you're ready to go. No shoving, no heavy lifting, no tools needed.

The powerful Triple-M Unit does the hard work. One-Spot Control from behind the handles gives complete command of all operations—mowing lawns or high grass or trimming close to borders . . . mulching leaves . . . tilling or cultivating . . . clearing snow.

Triple-M equipment costs less and takes less storage space than separate single-purpose tools. You can buy what you need now, add others later. See your Triple-M dealer and have him show you the year-around, all-around values of Triple-M, or write us for illustrated folder.



Triple-M PRODUCTS DIVISION

The Motch & Merryweather Machinery Co.
45407 BRIGHAM ROAD, GATES MILLS, OHIO

CASH for Cleaning Clogged Drains!

BE YOUR OWN BOSS FULL OR PART TIME

Enter this **essential profession** today as your own boss at big pay—no experience or previous training necessary. Clean, easy work. Many make $50-$75 a day! You can immediately do a professional-type job with this easy to use portable electric machine. Safe, sure, dependable action. Specially designed for one man operation. Approved by professional sewer cleaners! Cash in now. Prospects everywhere for this vital service! Start in your own neighborhood. Send immediately for full details on this unique profit opportunity—sewerline maintenance is a steady year 'round business **every** year!

LITTLE OSCAR

For wastelines up to 4". A low-cost profit maker. Also famous "Clean Rite" model for pipes up to 10". Send now for FREE literature. Life is fun when you're a success!

★ Splash Proof Reel
★ Lightweight
★ Heavy Duty Motor
★ Guaranteed

GROVE MACHINE WORKS
P. O. Box A-136 Bowling Green, Ohio

PENN YAN BOATS...

New Striptites!
All Wood—No Soaking, Work-Free!

Outboards, inboards, Cartops®, Trailboats, canoes, sailers—all beautifully finished, masterfully built. Types for fishing hunting, cruising. Choose from over 100 models of fine, small watercraft.

Free **CATALOG:** 44 pages, color illustrations. Write TODAY! Penn Yan Boats, Inc., 35th St., Penn Yan, N. Y.

Learn the Secrets

BREED RARE

tropical fish

Proof of tremendous profits!

KIND OF FISH	EGGS OR YOUNG PRODUCED AT ONE BIRTH	APPROX. RETAIL PRICE OF FULL-GROWN FISH
Swordtail	20 to 100	$3.00 to $4.00 Pr.
Red Betta	70 to 200	3.00 to 4.00 Pr.
	100 to 100	6.00 to 11.00 Pr.

...IN YOUR HOME...SPARE ROOM, BASEMENT, GARAGE...ANYWHERE!

EARN BIG MONEY—SPARE TIME

New "Chance of Lifetime" opportunity! Start your own spare or full time business once you know the revealing breeding secrets. It's fascinating! It's Fun! Breed EXOTIC and graceful "Angel Fish", BEAUTIFUL "Gourami" that are 12 DIFFERENT COLORS, "Fighting Fish" THAT FIGHT UNTIL DEATH; "Danio" that are STRIPED LIKE A ZEBRA; TRANSPARENT FISH—hundreds of expensive varieties. Some fish lay 300 to 600 eggs at one time. (Some very rare fish have sold for over $75 a pair.) Get into PARTNERSHIP WITH NATURE and let nature multiply your profits for you. NO EXPENSIVE EQUIPMENT—NO EXPERIENCE NECESSARY. WE SUPPLY EVERYTHING YOU NEED. **HELP FILL HUGE DEMAND** from stores, offices, theaters, hotels, etc. New plan lets **YOUR MAILMAN BRING YOU ORDERS.** Investigate TODAY.

FREE! Colorful "How To Do It" success BOOKLET, REPRINTS, breeding BROCHURE and ALL DETAILS. Rush coupon today!

RUSH this Coupon TODAY!

Tropical Fish Breeders of America, Dept. C4
1010 S. Los Angeles St.,
Los Angeles 15, California

Dear Sir:
Please rush me all Free Details.

Name_____
Address_____
City_____
State_____
Your Age_____

MEN! TRAIN NOW FOR A BIG PAY FUTURE IN

DIESEL

& SCIENTIFIC MOTOR TUNE-UP

- Diesel Construction
- Diesel Engine Repairmen
- Diesel Operator
- Industrial Maintenance
- Auto Engine Rebuilding
- Bus & Truck Maintenance

Be a Trained Diesel Man

Go places with DIESEL! Farms, factories and power plants, trains, ships, trucks, busses all use DIESEL POWER . . . all need DIESEL-trained men! You can start your DIESEL training at home, in spare time, with tested, proved U E I training. Course includes practical work on Diesel engines under skilled instructors. You learn the operation, maintenance, servicing of all types of Diesel engines, PLUS Scientific Motor Tune-up.

ACT NOW! If you have mechanical ability, **you'll like *Diesel!*** High School diploma not necessary. Write now for FREE book, "EARNING POWER IN DIESEL." Act Today!

MAIL NOW FOR FREE BOOK!

UTILITIES ENGINEERING INSTITUTE, Dept. DM-31
2521 Sheffield Ave., Chicago 14, Ill. *(Founded 1907)*

O. K.! Rush, without obligation, FREE Book on DIESEL.

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

☐ Check here for information if under 17.

Building or Modernizing Your Kitchen Cabinets?

Add the distinctive beauty of McKinney Forged Iron Cabinet Hardware

A complete line of quality Forged Iron Cabinet Hardware of authentic historic design. Three finishes —dull black, Swedish (relieved) iron and Olde Copper. Beautiful results on either natural or painted wood surfaces. Buy at your hardware dealer's.

SEND 10c AND COUPON FOR BOOKLET TO:

McKINNEY MANUFACTURING CO.
1715 Liverpool Street, Pittsburgh 33, Pa. PS

Name _____

Address _____

City _____ Zone _____ State _____

SAVE UP TO 74% ON

FURNITURE...

Do Your Own

- ★ REPAIR
- ★ BUILDING
- ★ DECORATING
- ★ MODERNIZING
- ★ GLUING
- ★ REFINISHING
- ★ OVERHAULING
- ★ PAINTING
- ★ MAINTENANCE
- ★ REUPHOLSTERING

SIMPLIFIED DETAILS IN NEW BOOK

With *"How to Build and Repair Your Own Furniture"*, new 256-page "how-to" book, you'll be able to own that furniture you've always wanted—and make your present furniture look brand-new! Popular Science Editors have poured all their knowledge and skills of home furnishing into one great book written especially for men who want to furnish their homes handsomely—at little cost! Detailed, easy-to-follow photos and directions make it easy!

BUILD FURNITURE FOR EVERY ROOM IN YOUR HOUSE!

You can make coffee tables, chairs, desks, lamps, bookcases, kitchen equipment, consoles, cabinets, children's furniture, plastic furniture, cabinets—for all types of decorating—period or modern! Most of the 163 simplified projects can be done with *simple tools* found in any home!

SEND NO MONEY NOW!

Just mail coupon below with your name and address and pay postman the low, *low* price of $2.49 (plus postage) on delivery. After 7 days free trial, if not satisfied, return book for money back. But hurry, supply is limited!

MAIL FREE-TRIAL ORDER FORM TODAY!

POPULAR SCIENCE PUBLISHING CO., Dept. 454
353 Fourth Avenue, New York 10, N. Y.

Please rush my copy of *"How to Build and Repair Your Own Furniture"* in edition checked below. When postman delivers my copy, I'll pay low price indicated, plus postage. If not completely satisfied, I may return book within 7 days for full refund.

☐ **Regular Edition, bound in handsome Linen Finish Kivar, Only $2.49**

☐ **Deluxe Edition, Stamped in Silver Color, bound in Red Duotone Kivar, Only $2.99**

NAME _____
(Please print plainly)

ADDRESS _____

CITY & ZONE _____ *STATE* _____

☐ **Check here if you remit now. We pay postage. Same return guarantee.**

IDEAL LAWNMOWER SHARPENER

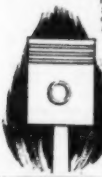
BOOST YOUR INCOME

You can earn extra cash with the Model 300 Ideal Lawnmower Sharpener. Used and recommended by leading manufacturers and service shops, the Ideal has everything you need, nothing else to buy. Grinds reel and bed knife, also reconditions. Get started now in this highly profitable business. Write for catalog today.

The FATE-ROOT HEATH Co.
Dept. PS-4, Plymouth, Ohio

IS YOUR CAR BURNING OIL

Pouring oil into your car doesn't solve the problem. Why burn oil and your money while driving a car that's losing its pick-up day-by-day. You can end your "oil misery" in a jiffy with AUTO LIFE . . . increase compression and save money on gas as well. All you do is squeeze a little of this amazing discovery into each cylinder through spark plug openings . . . your engine does the rest by distributing the seal to all worn pistons, cylinders and ring spots. Stops burning oil because it stops oil from reaching combustion chambers where it burns. Do it yourself in 10 minutes and enjoy new car performance for at least 10,000 to 15,000 miles. Do it with AUTO LIFE and eliminate costly engine overhaul and ring jobs. SEND NO MONEY—pay the postman $3.95 plus postage or send check or money order and we'll pay postage. We guarantee complete satisfaction or your money refunded immediately.



Stop it!

D. Z. AUTOMOTIVE INDUSTRIES, 142 Henry St., New York 2, N. Y.

BLOOD PRESSURE GAUGE

for HOME USE . . . Keep check on yourself! Prevent strokes, kidney damage, etc. Manual has full details on what is prescribed in 95% of all high blood pressure cases. Unit includes a Blood Pressure Gauge, Arm Bandage, Sleeve, 2 Valve Bulb, Base, Stethoscope and 25 Grams of MERCURY. Easy to operate. **Complete outfit sent prepaid for $5.98 or simply send name and address and pay $5.98 plus C.O.D. and postal charges on arrival.**

$5.98

JOY SPECIALTY COMPANY
Scientific Instrument Department
2320-G W. Hubbard St., Chicago 12, Ill.
"Send for Free Circular"

GIANT 100 POWER DAY & NIGHT TELESCOPE

Steel and brass tubing construction. Ready to use. Two eyepieces. Instructions for use as a helioscope!! Extra heavy tripod. $7.95 fob factory, 400X telescope makers lens kit has brass focusing tube, erector, 5 lenses and instructions. $3.95 postpaid.

CARL W. JAMER, Dept. SS, MANORVILLE, N.Y.

BEAUTIFY YOUR BATHROOM

Now you can have an enclosed bath and SAVE UP TO $100. with the Do-It-Yourself glass bathtub enclosures.

5' Width $89.95 5½' Width $99.95

These custom units can be self-installed in minutes. You can afford this beautiful glass bathtub enclosure and eliminate messy and costly shower curtains—no more splashing on the floors, no more drafts while bathing or showering. Made of frosted or fluted (indicate choice) 7/32" glass, set in neoprene rubber. Heavy gauge, extruded polished aluminum that won't rust or corrode. Overhead suspension with cadmium plated ball-bearings for easy finger-tip control. Drain holes in bottom guide track allow excess water to run back into the tub. These models for recessed tubs only.

Check the prices of other glass bathtub enclosures and you will realize the tremendous savings with this easily installed unit. ORDER TODAY for immediate shipment on money back guarantee. Specify fluted or frosted model and width desired—5' or 5½'. Shipping charges collect. Send check or money order or $10.00 deposit on all c.o.d.'s. No C.O.D.'s outside of U.S.A.

BATTLE SALES CO.
63 South Parkway Clifton, New Jersey

Do YOUR gardening the EASY power way

BOLENS NEW 1954 POWER-HO GARDEN TRACTORS

featuring amazing

POWER-HO SUPER VERSA-MATIC MODEL 15 FD

THERE'S A BOLENS TRACTOR FOR EVERY GARDENING JOB

BOLENS HANDI-HO

BOLENS RIDEMASTER

BOLENS GARDENER

• POWERFUL • LIGHTWEIGHT • SMOOTH SAFE OPERATION • LOW COST • YEAR 'ROUND SERVICE

With this one-lever Versa-Matic control, a Bolens owner can choose any desired forward speed or reverse, without shifting, clutching or belt changing. All at full engine governed speed with no throttling down and loss of power. If operator releases handle when in reverse, tractor automatically goes into neutral—a great safety feature...Bolens offers 3 other Power-Ho Models, Too!

TRACTOR ATTACHMENTS

Bolens offers as many as 111 tools and attachments such as cultivator, disc harrow, circular saw and lawnmower.

AMERICA'S FINEST OUTDOOR POWER EQUIPMENT

MAIL COUPON TODAY

BOLENS PRODUCTS DIVISION
Food Machinery and Chemical Corporation
267-4 So. Park St., Port Washington, Wisconsin
I am interested in literature on:

☐ TRACTORS ☐ POWER MOWERS
☐ TILLERS ☐ CHAIN SAWS

Name_____

Address_____

City_____ Zone____ State_____

41 NEW MODELS for 1954

Custom-Craft

THE ORIGINAL "PACKAGED"

BOAT KITS

RATED "TOPS" BY THE EXPERTS in DESIGN, STYLING, PERFORMANCE

See the World's finest, most complete line before you decide! 41 exciting new models

SEND 25c for BIG, NEW 1954 KIT CATALOG

1954 Catalog PLUS booklet "Boat Selection, Operation & Maintenance" $1.00 (Refundable)

DEALER INQUIRIES INVITED

Worlds Finest Designs

Modern BOAT PLANS

With FULL-SIZE PAPER PATTERNS EASIER TO BUILD, SAVES TIME, MONEY

Over 150 modern plans and patterns with material lists and building procedure. Racing classes, cruisers, inboards, outboards, sailboats, 6 to 36 ft. All materials, fittings, etc. available at "Package" prices. Big savings! Design Catalog tells all!

SEND 35¢ for 1954 DESIGN CATALOG

Design Catalog PLUS boat building handbook, $1.00

CUSTOM-CRAFT • DEPT. 5 • BUFFALO 7, N. Y.

HULL AUTO COMPASS ACCURACY COUNTS

● You may never need your Hull Auto Compass for emergencies such as blizzard rescue work, where its dependable accuracy has proved a life-saver. But, the same accuracy will repeatedly save you driving strain and the expense of wrong-way miles. Write for local dealer's name, free literature.

PATENTED COMPENSATORS MAKE THE HULL EASIEST TO COMPENSATE, MOST ACCURATE

Beaconlite DESIGNATED $6.95

STREAMLINE NON-ILLUMINATED $4.95

HULL MFG. CO. P.O. Box 246, E-4 WARREN, OHIO

SPECIAL IMPROVED DESIGNS

Weighs 12 oz!

8 x 25

$19.95

Revolutionary designed binoculars that are lighter, easier to hold, easier to focus and lower priced. UNITED recently proudly introduced this fine, precision built line of superb glasses. The compact, 4"x5¼" 8 power binocular weighs only 12 ounces! AND provides an excellent field of 390 FEET at 1000 YARDS. Each binocular is both water, dust resistant. UNI-COATED! Inside surfaces of vital prisms and front and rear Achromatic lenses are COATED for brighter, sharper viewing! Made in Japan by skilled optical craftsmen of precision materials. It explains why prices are so low and quality so high. UNCONDITIONALLY GUARANTEED by UNITED, "America's Outstanding Binocular Retailer."

7 x 35 I.F.*	20 ounces	$27.95
7 x 50 I.F.*	26 ounces	29.95
12 x 50 C.F.*	27 ounces	39.95
7 x 35 C.F.* (Wide Angle 525' Field)	26 ounces	49.95

Add $1.00 for postage and handling. *I.F. are individual and C.F. are Center Focus. Genuine leather case and straps included.

USE 30 DAYS AT OUR RISK

If not fully satisfied return for full refund. C.O.D.'s require $2.00 deposit. Add Federal tax. UNITED BINOCULAR CO., 9043 S. Western Ave., Dept. ARP-9216, Chicago 20.

DEALERS WRITE FOR LATEST WHOLESALE CATALOG

COLOR PRINTS

From Your Transparencies

Electronically controlled for superb results. Rapid service and satisfaction guaranteed.

Prints from any size transparency | ANSCO COLOR KODACHROME EKTACHROME

4 x 5	5 x 7	8 x 10
50¢	$1	$2

25c 2¼x3¼

Min. order $1. No C.O.D.'s

PROCESSING: ANSCO & EKTACHROME 24 hours—Roll Film 120-620, 35 mm, 20 ex mtd. . . . Only $1.00 roll

COLORFAX LABORATORIES DEPT. S-44 BOX 3521 Georgetown Sta., Wash. 7, D.C.

Assemble Your Own DIVING LUNG

We furnish the parts and instructions. Complete outfits $39.95 and $49.95

Write for descriptive literature

Assemble Your Own Portable EMERGENCY OXYGEN OUTFIT

Complete parts and instructions furnished. Outfits from as low as $9.50 up to $59.50. Write for literature.

● Air & Oxygen Tank. For Diving Lungs, etc. 295 cu. in. capacity. 1800 psi. Hydro. tested, current dating. ICC3A1800. Reconditioned. Wt. 12¾ lb. F.O.B. St. L. $10.95

FREE Catalog! Underwater swimming equipment. Write today!

Ed. Aguado Trdg. Co., Dept. E, Box 4525 Plaza Sta., St. Louis, Mo.

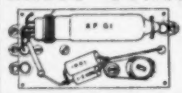
BREAKS THE GRIP OF RUST

KROIL, the amazing chemical lubricant, creeps into millionth inch spaces and loosens frozen metal parts when all others fail. Used by 12,000 leading industrial shops.

Try KROIL on money back basis—gallon $3.85 FOB fcty. —or send $1.50 for two 8 oz. spout cans—Postpaid

KANO LABS 1031 Thompson Ln., Nashville, Tenn.

RADIO CONTROL YOUR MODELS



"DELUXE MIDGET 1" RADIO CONTROL, CONSISTS OF LICENSE FREE BAND TRANSMITTING RADIO, A RECEIVING RADIO & A CONTROLLING ESCAPEMENT LONG RANGE. TO OPERATE MODEL AIRCRAFT, BOAT, & AUTO MODELS. ALL THREE UNITS ABOVE SIMPLE ASSEMBLY WITH OUR PARTS & PLANS $9.98

DETAILED INFORMATION & RADIO CATALOG - 25c

SPECIAL "SUPPLY DIRECTORY" & SUPPLY COUPON, (coupon value $7.00) ONLY - - - - - $1.00

"DELUXE MIDGET 1" RADIO CONTROL $9.98

RADIOMODELS, BOX 36, DEPT. P BALTIMORE 6, MARYLAND

250 POWER . . . . .

Complete Telescope Lens Kit only $3.49 postpaid

Conquer Space, Explore the Universe, Planets, Moon Craters, New Stars, etc. Complete Lens Kit consists of 80 inch focal length ground and polished objective lens, eyepiece lenses for 50 POWER, 100 POWER, 150 POWER, 200 POWER, 250 POWER, and all necessary lens fittings. Easy to make from simple step by step instructions. (Tripod and mount not included.) Money back guarantee.

BUSSE SALES CO., Hartford, Conn., Dept. PS-20

A GUN BARGAIN YOU JUST CAN'T PASS UP!

Lowest Priced

TOP QUALITY 22 CALIBER PISTOL EVER OFFERED! FULLY GUARANTEED

10 SHOT FAMOUS "UNIQUE" BRAND NEW .22 L. R. AUTO PISTOL

Made in France-Shoots ALL regular & Hi-Speed Ammunition

ONLY $32.00 DIRECT BY MAIL TO YOU!

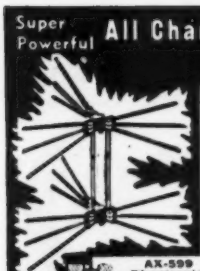
Complete Service and Parts Always Available

SEND ONLY $5.00—PAY BALANCE ON DELIVERY—OR REMIT IN FULL.

LAFAYETTE ASSOCIATES • 4920 LIVINGSTON RD. S.E. WASHINGTON 21, D. C.

Super Powerful

All Channel TV RECEPTION IN ALL DIRECTIONS



Rocket DIRECTRONIC MOTORLESS TV ANTENNA

360° Electronically Switched Beam

- No Motors
- No Ghosts
- No Roof Orientation
- Flick of Switch Clears Picture Instantly
- No Electric Power

In the city or in an ultra-fringe area, the Directronic will 'out-perform ordinary antennas. Only the Motorless 360° Directronic TV Antenna offers "around the compass" reception WITHOUT Rotors. Clarity of picture will amaze. It's so bright, so sharply defined. AX-599 "Serviceman's Array" contains Hi-Pac molded insulator of extremely high tensile strength, 18 ft-tensile aluminum alloy elements, 1 set connecting stubs (3), Universal U-Clamps for masts to 1½", Directronic Beam Selector, 75' Tri-X Cable.

AX-599 Directronic $16.95 You pay postage

Do not remit more than complete purchase price, 25% deposit on C.O.D. orders, please. Money-back guarantee.

NATIONAL ELECTRONICS OF CLEVELAND

404 DELCO BLDG. CLEVELAND 3, OHIO

ADDRESS

POSTCARDS AT HOME

MAKE MONEY!! SPARE OR FULL TIME

write

LINDO 307, WATERTOWN, MASS.

Precision FACETING Machine Now — Calibrated!

For professional and advanced amateur gem cutters. Micro-adjustable, settings calibrated. Entirely new in design. Velvet smooth, vibrationless. Perfect for diamond tool sharpening. FREE ILLUSTRATED LITERATURE.

Gemcrafters 11660 W. Olympic Blvd. Los Angeles 46, Calif.

CALCULATING CALENDAR

TO FIND NUMBER OF DAYS BETWEEN DATES OR START OR END DATES OF ELAPSED PERIODS

TO USE AS A CALENDAR ANY YEAR 1BC TO FOREVER!

CALENCULATOR

SEND $2

1417 SO. 18TH AVE.

MAYWOOD, ILL.

Free Book on Arthritis And Rheumatism

HOW TO AVOID CRIPPLING DEFORMITIES

Explains why drugs and medicines give only temporary relief and fail to remove the causes; tells all about a specialized non-surgical, non-medical treatment which has proven successful for the past 35 years. Write for this 44-page FREE BOOK today.

Ball Clinic **Dept. 36** **Excelsior Springs, Mo.**

BUY FROM MANUFACTURER

ATTIC EXHAUST FANS

$39.95 F.O.B. N.Y.

28" COMPLETE WITH G.E. MOTOR ⅓ HP. A.C. 110V STEEL FRAME —TORRINGTON BLADE

GUARANTEED FOR FIVE YEARS

Easy to Install And Assemble

Albin Machine Co. 750 6th Ave., N. Y. C.

Send Check or Money Order. 425 W. Jefferson St., Detroit, Mich.

C.O.D. send $5 deposit. 1529 Vine St., Cincinnati, Ohio

YOU CAN START A

$40 A Day Business

IN YOUR SPARE TIME!

Andy Phillips says:

"My BELSAW SHARP SMITH gives me big profits at low expense —I can run 35 to 40 circular saws in an 8-hour day—that makes me $40 cash—I also get BIG EXTRA PROFITS, . . grinding planer and joiner knives — always a big demand for this kind of work."

YOUR OWN CASH BUSINESS

You can start this REPEAT CASH business in your own home or garage while you are working at your regular job. Easy to operate, no experience needed. "My BELSAW paid for itself the first month."—*H. J. Opie*

For as little as $15 down payment, you can get your BELSAW Sharp Smith rushed to you.

NO EXPERIENCE NEEDED . . .

YOU can start making money the very day your BELSAW Sharp Smith arrives. Earn $4 to $5 an hour in your SPARE TIME sharpening circular saws and machine knives for your neighbors, builders, lumber yards, and factories. A pleasant spare-time hobby that gives you extra cash income and can be built into a full-time $40-a-day business.

FREE BOOK TELLS HOW ▶

You can start this REPEAT CASH business right at home in your spare time.

LIFE-TIME SECURITY with YOUR OWN BUSINESS

Send Coupon or Postcard Today
No Salesman Will Call

BELSAW MACHINERY CO
44-P Field Bldg., Kansas City 11, Mo.

Send FREE book, "Lifetime Security"

Name_____

Address_____

City_____ State_____

GET INTO BUSINESS FOR YOURSELF!

EARN 2 PAYCHECKS INSTEAD OF ONE!

Keep your present job—build a profitable business of your own *(on the side)*. By printing WITHOUT A PRINTING PRESS in your own home. Material for $100 jobs cost less than $10.00 *Amazing Profit Opportunity!*

AT HOME! SPARE TIME! EARN UP TO $10.00 PER HOUR!

We show you how to earn big money in your spare room, garage or basement with our revolutionary new printing method. *Hundreds already successful.* Easy to learn—no experience or expensive equipment necessary! WE SUPPLY EVERYTHING. Start you on a "shoestring."

MIRACLE NEW PRINTING METHOD. *Revolutionary discovery!* You need *NO* EXPENSIVE PRINTING PRESS yet this amazing development lets you print 25, 50, 100, even 1000 copies in many cases for LESS MONEY THAN YOU CAN PRINT ON A $5,000 PRINTING PRESS. Prints in over 50 different colors—prints on PAPER, CARDBOARD, LEATHER, GLASS, WOOD, CLOTH — *ANYTHING!* Amazing — but true! Just put any material under a screen and take out beautiful, colorfully printed pieces. It's EASY! Be FIRST to *learn the secrets.* Investigate today!

AMBITIOUS MEN AND WOMEN WANTED! Unlimited opportunities regardless of age. We must have top representatives all over U.S. immediately to HELP US FILL HUGE DEMAND. Orders come from markets, theatres, churches, clubs — all kinds of businesses.

MAIL COUPON TODAY! It will bring your complete "HOME-BUSINESS PLAN," actual "SAMPLES" printed by this amazing Printing Method, "SUCCESS PLAN" and all the CONFIDENTIAL FACTS. Act NOW! Grasp this limited OPPORTUNITY NOW! Investigate.

HOW TO START A HOME-BUSINESS BOOKLET—FREE

FREE! RUSH COUPON

SCREEN PRINT

SCREEN-PRINT CO., Dept. 14
1010 So. Los Angeles St., Los Angeles 15, Calif.
Gentlemen:
Please rush everything immediately. I am interested.
Name _____
Address _____
City _____ Zone ____ State _____

BENJAMIN SUPER CO_2 GAS CARBINE—$16.50

NEWEST TARGET RIFLE—.22 IDEAL FOR SMALL GAME

ECONOMICAL
SAFE-NON-TOXIC
ACCURATE-CONVENIENT

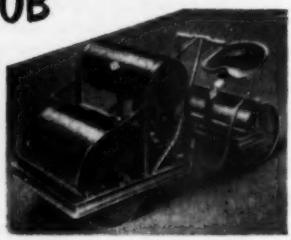
PRACTICAL. Easy to operate—No pumping—No spring recoil. Uses low cost Soda Cartridges, Cal. .22 Benjamin H-C Pellets and Darts.

Benjamin CO_2 Gas Pistols Also Available

WRITE FOR FREE ILLUSTRATED FOLDER OF ALL MODELS
BENJAMIN AIR RIFLES AND BENJAMIN AIR PISTOLS
BENJAMIN AIR RIFLE CO.
852 MARION ST., ST. LOUIS 4, MO. U.S.A.

Does BIG JOB

at small cost



The new improved 1954 CON-SOL All Purpose Power Roller tops even superb performance and dependability of earlier models that are still rolling up an enviable reputation for low cost, top-quality on asphalt and other "hot-top" paving and maintenance work. Equipped with sprinkler tank that wets rollers, preventing sticking of hot asphalt—designed for greater strength, longer life and easier operation with low initial, operating and maintenance costs. Also used for all types of lawn and turf rolling.

Powered by Briggs & Stratton 2½ hp engine, model pictured is adjustable in weight from 375 to 1400 lbs. Lighter weight Standard Model, adjustable to 1200 lbs., also available. Ideal for lawns. Prices start at $350.00.

Write today for FREE literature to Dept. PS-4

CON-SOL

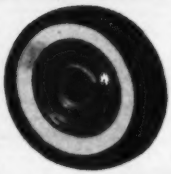
CONSOLIDATED INDUSTRIES, INC.
WEST CHESHIRE, CONN., U.S.A.

4 WHITE WALLS $9.95

100% NATURAL RUBBER

EASY TO PUT ON!

Turn your present black tires into custom white side walls, with these thick, natural rubber WHITE WALLS. Absolute perfection and satisfaction assured. Everything furnished for all four tires. Mail check or money order NOW. Introductory price for complete kit: only $9.95 postpaid. Sold coast to coast.



Department S M T

CUSTOM WALLS INC. P.O. Box 11758 Wagner Station Los Angeles 47, California

SOUND POWERED PHONES!

NEW

REQUIRES NO BATTERIES OR EXTERNAL POWER! OPERATED BY POWERFUL, PERMANENT INTERNAL MAGNETS.
UNCONDITIONALLY GUARANTEED!
Original government cost $58.00 — new, specially priced ..... $10.95 each

SEMLER INDUSTRIES INC. 6853 LANKERSHIM BLVD. NO. HOLLYWOOD, CALIF.

STOP RADIO & TV NOISES INSTANTLY

$1 2 for $1.50

NEW PATENTED ELECTRONIC INVENTION "CLEAR TONE" filter eliminates noisy interference caused by all motor appliances, autos, oil burners, etc. Simply plug radio or TV cord into filter and filter into wall socket. Enjoy "CLEAR TONE" reception. Try 5 days—MONEY BACK GUARANTEE.

Household Prod., Dept. PS-4, Scarsdale, N. Y.

DIALS LIKE A TELEPHONE

You're Right!

NOBODY LIKES TO ADD & SUBTRACT FRACTIONS

Get a Fractionator "IT ADDS AND SUBTRACTS FRACTIONS"

$1.00 POSTPAID U.S.A.

Direct reading. Answers in Fractions & Decimal Equivalents. 100% Accurate. Handles all Engineering Fractions.

Direct Mail Only Refund if not Satisfied

Chas. E. Wells • Box 25-B • Montrose, Calif.

Machinists! Mechanics! Hobbyists!

Don't stick matches or toothpicks in your eyes. Remove steel and iron chips safely with the MAGNETIC EYE OPENER. Removes chips without touching the eye. Many other uses such as cleaning chips from drill chucks. Results guaranteed.

ONLY $1.00 Ppd.

LEE MFG. CO., Box 2021, Beaverdale Sta., Des Moines, Iowa

WRITE TODAY FREE CATALOG

Make money and enjoy the pleasure and profit of "TANDY-CRAFT"—America's easiest "Do-It-Yourself" Hobby.

Get our giant FREE 1954 LEATHERCRAFT CATALOG.

NATIONWIDE—A TANDY STORE NEAR YOU

Tandy LEATHER CO. (SINCE 1919)
P. O. BOX 791-JC Ft. Worth, Tex.

YOURS! THE GREATEST THRILLS IN BOATING FOR AS LITTLE AS $12 A MONTH

plus small down payment

KLEPPER

UNSINKABLE AERIUS FOLDING BOAT

Stows away in 2 easy-to-carry packages, fits into car trunk, goes wherever you go. Sets-up into trim 17 footer in minutes. Ideal for boating, fishing, hunting or white water thrills.

ready to launch from $159

EASY TO SET UP: A child can do it!

STURDY: Tough, resilient hull of multi-ply rubber tire construction on rugged frames of seasoned mountain ash and plywood. Superior in quality, workmanship to any similar product. No tools needed, no bolts. New snap-lock fittings.

UNSINKABLE: Air tubes around the gunwales keep it always above water.

See the **KLEPPER FOLDING BOATS** *at* 1472 Broadway, New York 18, N. Y.

- Holds 4 adults, plus gear
- Tacks like a dream under sail
- Skims over water with light outboard
- Paddles better than light canoe
- Chosen by Byrd, Amundsen for expeditions
- A Klepper crossed the Atlantic sailed by Captain Romer

Write for FREE Catalogue

KLEPPER CO. Dept. PS4, 1472 Broadway New York 18, N. Y.

Please send me free illustrated color catalogue

Name_____

Address_____

City_____ Zone_____ State_____

Why let a tough job give you a chronic ACHING BACK?

Ever wonder *why* hard work makes back muscles ache and throb night after night? (It didn't when you were younger!) The reason is simple. As your muscles get older, they no longer support you properly. Without support, your midsection can get too strained and tired to "snap back" as it once did. So you *ache*. Fortunately, however, there's an easy, pleasant way to get . . .

Instant relief.

Bracer Supporter Belt is the answer. Bracer is the kind of *man's* garment that gives firm support to the muscles that aren't supporting *you*. Helps relieve backache, helps you feel less tired. Helps you . . .

Look better, too.

Bracer helps pull your stomach back to its *natural* position. Helps you stand straighter and taller. Its wide waist band is knit of cool, elastic cotton. Tube-weave leg straps can't curl or bind. Attached or detachable pouch models—each with convenient fly front. $3.95 and up at drug, men's wear, surgical supply stores. Get your Bracer today!

FREE BOOKLET For additional facts, write today for free booklet. "Feel Better, Look Better." Bauer & Black, 309 W. Jackson Blvd., Chicago 6, Ill., Dept. PS-4

Bracer®

SUPPORTER BELT

Made by Bauer & Black Division of The Kendall Co.

NEW 1954

Do-It-Yourself LUMBER CATALOG

FEATURING AMERICA'S FINEST FURNITURE AND CABINET LUMBER FOR THE HOME SHOP CRAFTSMAN

Now you can buy your "Do-It-Yourself" Lumber in small quantity orders of $20 or more. Send for new 32-page, net price catalog which contains detailed information on 16 species of Furniture Lumber, Plywood, Dowels, Turning Squares, etc., as used by the home craftsman.

● *For complete catalog, send 15c to cover handling and mailing costs. Mimeographed Price List sent free.*

HARDWOOD CORPORATION OF AMERICA

E. L. DIVISION
Box 1091, Dept. S
Asheville, N. C.

I enclose 15c for "Do-It-Yourself" lumber catalog.

Name_____

Address_____

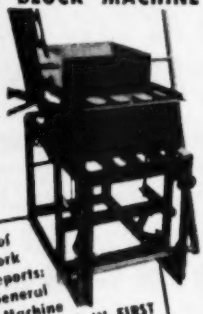
City_____ Zone_____ State_____

own your own business! earn up to

$75 A DAY CLEAR PROFIT

in your back yard or basement!

MAKE CONCRETE BLOCKS With Amazing New LOW PRICED GENERAL BLOCK MACHINE



NOW! Big Building Boom Profits Within Your Reach

You don't need much cash to cash in on the building boom! New high speed, low cost General Block Machine produces up to 1,000 concrete blocks a day for homes, factories, buildings, garages. Your profit markup is 100% to 150%! Fool-proof, easily operated, sturdy steel machine can make any size from 4" to 12". These superior 3-core blocks meet all building code requirements for foundation, chimney, corner, sash and many other types of blocks. Works indoors or out. Sand, cement and water available anywhere! Simple operating instructions and mixing formulae for cement and cinder blocks supplied FREE. Get full details, no obligation!

EXTRA!

Amazing illustrated book gives floor plans for 6 sensational concrete block bungalows. Tells how to lay blocks, lay out building lines, mix concrete, build steps, porch and concrete floors all at great savings. Written by experts. Can save many times the cost of the machine! Get it now! No strings attached.

R.L.T. of New York City Reports: "My General Block Machine PAID FOR ITSELF IN FIRST 2 WEEKS!"

Thousands now in use the world over

Write for FREE details TODAY

HOW TO BUILD YOUR OWN CONCRETE BLOCK HOME

SEND $1 — Refunded if you buy machine!

GENERAL ENGINES COMPANY

Dept. S-44, 307 HUNTER STREET, GLOUCESTER, N. J.

Stop Wasting Gas!

If your car, truck or tractor is a "gas hog"

Try a TUR-B-LIZER 30 days at NO RISK

See why users report up to 6 miles more per gallon. See why carburetor experts call the TUR-B-LIZER the best improvement they've seen for trapping raw gasoline your carburetor fails to vaporize. Only $3.00 for 6-cyl. single manifold TUR-B-LIZER, $4.50 for 8 cyl. or double manifold and easy to install, try it! Money back promptly, if not satisfied. Send check or M.O. to—

Salesmen write for Big Deal

UNIVERSAL SALES 625 E. State St., Milwaukee, Wis.

DRILL SAW **REAM CUT**

INTERNATIONAL

HI-SPEED COPE SAW DRILL BIT

DRILL, SAW, REAM . . . metal, pipe, wood, plastic, Transite, etc. Use with any electric drill, slow drill press, lathe or milling machine. Drills own starting hole—upper part of bit is used to cut, saw or ream circles, ovals, squares, or scrolls. Easy to operate. Ideal for carpenters, mechanics, electricians, plumbers, hobbyists, many others. Abrasive resistant, high speed steel. Flutes ground from solid. Will withstand severe continuous use without breaking. Resharpened at no charge. Takes place of up to $50 in tools. ¼" diameter, 2" cutting sections, total length 3½". Available in three types—All Purpose, Wood, Heavy Metal. Specify type needed. Set of 3, $11.50. Details on request. Shipped same day. Money-back guarantee. Dealer inquiries invited. ORDER NOW! SEND CASH, CHECK OR MONEY ORDER.

only $3.95 POST PAID

Manufactured and distributed by

INTERNATIONAL TWIST DRILL CORP

618 Wyandotte, Rm. 694, Kansas City 5, Mo.

DON'T SETTLE FOR *Less!*

SEND FOR THE STORY OF THE WORLD'S MOST ADVANCED MOWER

GEORGE

ADDITACHMENTS FOR USE WITH SAME POWER UNIT
- DUMP BARROW
- SNOW PLOW
- GARDEN TOOLS

SELF-PROPELLED ROTARY MOWER 20"

ONLY $159.00 F.O.B.

WRITE FOR ILLUSTRATED BROCHURE

Dept. A GEORGE GARDEN TOOLS • SULLIVAN, ILL.

Find **HIDDEN TREASURES**

GEIGER COUNTERS (as shown) for Uranium Detection. TREASURE DETECTORS for gold, silver, etc. Lightweight, ultra sensitive. None finer. Also Mineralights for Tungsten.

• INFORMATION FREE •

Detectron CO. Dept. PS-8

5420 Vineland, North Hollywood, Calif

make your own *Gems* 29.50 F.O.B.

The Gem Maker comes complete with all necessary equipment, including a super-charged diamond blade for sawing, and all wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt, for only $29.50, f.o.b. Burlington, Wisconsin. Write today for information and literature.

B & I MANUFACTURING CO.

Dept. 8 Burlington, Wis.

Make Your Own TV REPAIRS!

This Book Can Save You $50 — $100 Per Year

Instructions Compiled Exclusively For Your TV (Not just a diagram service)

Fix 85% of TV troubles, easy as replacing light bulb! Save $$$! New TV REPAIR GUIDE reveals many "trade secrets" on trouble-shooting, tube replacing, antenna adjustment, *everything*. Makes repairs *fun, easy, safe!* Includes detailed layout of *your* TV. Gives Tube prices—prevents overcharging. State set make, model.

ONLY $1.00 ppd.

TV REPAIR GUIDE

MONEY BACK IF NOT WORTH TEN TIMES THE PRICE!

L. S. ENGINEERING, Dept. P-4, Box 4113, North Hollywood, California

$750 BUILDS 4 ROOMS & BATH!

WHY PAY RENT? For Seven Hundred Fifty Dollars and 30 days of your spare time, you can build yourself this Beautiful Home.

Living room, 11x15. Front bedroom 9x11. Back bedroom 10x12. Kitchen 9x11. Bath 5x8. Hall 3x4. Wind out steel casement windows. Concrete block, stuccoed. Step-by-step illustrated instructions, blueprint and material list. $1.00 ppd. No COD. Money back guarantee. Economy Home, Box 645, Dept. D, Columbus 16, Ohio

When Writing To Advertisers Please Mention Popular Science

MEN PAST 40

Men afflicted with Bladder Trouble, Getting Up Nights, Pains in Back, Hips, Legs, Nervousness, Dizziness, Physical Inability and General Impotency send for our amazing **FREE BOOK** that tells how you may correct these conditions and have new health and Zest in Life. Write today. No Obligation.

Excelsior Institute, Dept. B-5, Excelsior Springs, Mo.

Get into.. PLASTIC LAMINATING AT HOME!

THIS MAN . . . is taking out of the machine a Plastic Sealing Job — ordered by mail — only 11c in material cost brings back $2.58 in cash by mail. Capacity of machine: **$25.00 profit per hour of operation.**

Get ORDERS and CASH from your mailman—do work in SPARE TIME at home —or expand into FULL TIME business.

Send coupon for Free facts about the newest and most fascinating of all home operated businesses. For the first time a simplified machine brings the fabulous profits of **Plastic Sealing** and **Plastic Laminating** within the reach of the small operator. Anyone can learn to operate the machine with a few minutes practice—then with our **Magic Mail Plan** can get mail orders pouring in daily with cash in every envelope. ***No canvassing—no selling.*** We even supply the circulars you mail to bring back cash and orders. Don't waste a minute. Rush your name. We'll send you FREE and postpaid, pictures, prices, details, and all the facts you need to start. Mail coupon or send name on postcard. No charge.

Make $20 to $30 a Day by.. MAGIC MAIL PLAN!

Warner Electric Co., 1512 Jarvis Av., Dept. L-9-D, Chicago 26, Illinois

Make Thousands of Beautiful Art Creations

COSTUME JEWELRY • CIGARETTE BOXES
TRAYS • CANDLESTICKS • COASTERS
LAMP BASES • BOOK ENDS...ALL IN SPARKLING COLORED PLASTIC

WARNER ELECTRIC CO., 1512 Jarvis Av.
Dept. L-9-D, Chicago 26, Ill.
At no cost to me, please rush complete details postage prepaid. I am under no obligation.

Name_____
Address_____
City_____ Zone____ State_____

GERMAN PRECISION 22 BLANK PISTOL

SIX SHOT REPEATER AUTOMATIC

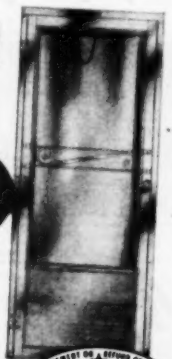
For fun . . . sports . . . protection against night prowlers! Precision made in the high traditions of German guncraft! Exact dimensions, finish and design of death-dealing automatics. Uses only .22 cal. harmless blanks. Specially designed chamber gives terrific percussion audible at enormous distances, enough to frighten the devlights out of any "character." 6 shot fully automatic magazine. Empties ejected automatically. Safety catch. Carbon steel construction; de luxe CORDOVAN handle. No police permit needed. Cartridges available everywhere for about 1c. Remit only 9.95 for quick prepaid delivery. No COD's on guns. Money back guarantee. Not sold in N.Y. State.

Thoresen's 352 Fourth Ave., Dept. 7-D-111, New York 10, N. Y.

CANADIANS, Write: Thoresen Co., 45 St. James St., Dept. 7-D-111, Montreal 1

Do It Yourself! SAVE $30

Duo-Dor



ALL-ALUMINUM STORM-SCREEN DOOR

$69.95 Value

$39.95* ANY STANDARD SIZE Push Grille Extra

REPLACEMENT OR REFUND OF MONEY IF NOT AS ADVERTISED THEREIN ★ Guaranteed by Good Housekeeping

Comes complete with Pneumatic Door Check, 3 Stainless Steel Hinges, Outside Aluminum Door Jamb, Latch Set and Wind Limit Chain

Over 1" Thick • Rugged All-Aluminum Construction • Adjustable for Perfect Fit • Aluminum Door Jamb • Heavy Aluminum Kick-Plate • Glass & Screen Inserts Interchanged Easily!

DELIVERED COMPLETELY ASSEMBLED! EASILY INSTALLED BY ANYONE!

*Slightly higher in some Areas.

Available at leading lumber or hardware dealers everywhere, or write:

the weather-proof co. Dept. PS
1407 E. 40th St., • Cleveland 3, Ohio

GROW Living MIDGET TREES! EARN BIG MONEY

•AT HOME
•IN SPARE TIME
•NO EXPERIENCE NEEDED

It's new! Amazing! At last, the secret of growing miniature (MING) trees can be yours. FULL GROWN, dwarf trees — only a few inches high. Beautiful miniature fir, orange, oak, Chinese elm, peach, pine, cypress—any kind! ALL BLOOM and even BEAR FRUIT. All perfect healthy specimens—but miniature in size! Make costly home decorations and expensive centerpieces. (SOLD FOR OVER $1,500 EACH) Big demand. Costs only pennies — takes only minutes per week. IT'S EASY! Fun! A new fascinating hobby — a new fabulous $$$$ business. Send for free secret plan details and real seed.

HELP US FILL HUGE DEMAND!

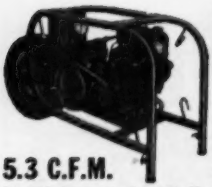
These trees are being demanded by STORES CLUBS • HOTELS • FLORISTS • HOUSEWIVES • INTERIOR DECORATORS • COLLECTORS • HOBBYISTS — A Big Money Opportunity FOR YOU.

FREE! GENUINE SEED AND PLANT

NATIONAL NURSERY GARDENS, Dept. H4
8463 South Van Ness
Inglewood 4, Calif.

Rush me FREE plan and seed IMMEDIATELY!

Name_____
Address_____ Zone____
City_____ State_____



AIR COMPRESSOR

SURPLUS! NEW Gov. Release!
Original Govt. Cost $350.00

The Finest 2-H.P. TWIN CYLINDER Industrial Unit Ever Built! **$129.00** f.o.b. Fully Guaranteed

5.3 C.F.M. **200 lb. PRESSURE**

Maintains 40 to 65 lb. pressure for CONTINUOUS spraying (no waiting 'til tank keeps building up)

Made by **Bendix Westinghouse** to rigid specifications. **A Buy** for Contractor; Factory; Garage; Service Station; Shop; **Farm! *PORTABLE!*** Two independent air outlets—one for high pressure (up to 200 lbs.)—the other controlled by regulator from 0 to max. Large face gauge. Adjustable Safety valve. Automatic unloader (adjustable up to 200 lbs.) keeps pressure constant without stopping engine. Welded hollow frame acts as air reservoir . . . assuring large supply of **Oil-Free** air with **Absolutely No Pulsation!** Sprays with material of any size. *Unexcelled for:* Spraying; Greasing; Tire inflation; Blowing out heating and refrigeration lines; Small pneumatic tool operation; Insecticide dusting and spraying; Flocking; Undercoating; **Specifications below:**

—COMPRESSOR—
- Mfg. by **BENDIX WESTINGHOUSE**
- Twin cylinder
- 4 Rings on each piston for added compression capable of pumping 1100 lbs. p.s.i.
- Forced pressure lubrication assures oil to every moving part
- Ball bearing construction
- Capacity 5.3 cu. ft.

—ENGINE—
- Mfg. by BRIGGS & STRATTON
- Kick or rope start
- 2 H.P., 4-cycle air-cooled
- Splash lubrication system
- 2-qt. gas tank
- Float feed carburetor with adjustable idle speed and automatic governor
- 3 Piston rings

ALSO AVAILABLE! Same unit with 1 H.P. Electric Motor, Single-phase, 110-220 volts, 60 cy **$129.00**

IMMEDIATE DELIVERY! SUPPLY LIMITED! ORDER FROM AD

FREE Catalog of AUTO TIRES and ELECTRICAL EQUIPMENT

ROBERTS ELECTRIC CO., Dept. 165, 849 W. Grand, Chicago 22, Ill.

MAKE EXTRA MONEY **PLASTICS** LEARN AT HOME

There are RICH OPPORTUNITIES for MEN and WOMEN with "know-how" in Plastics. Interstate's new Plastics course tells and shows how to make hundreds of fast selling items out of Plastics. Gives complete training in fabrication, casting, lamination, molding, internal carving, etc., in simple, easy, step-by-step language and pictures. Plastics and Fabricating Kits for 23 valuable Plastic items come with training at no extra cost. START A PLASTICS BUSINESS OF YOUR OWN. No other industry holds such promise for the future. You can make big money manufacturing novelties, toys, signs, etc., in your own home in spare or full time. Don't wait! Learn NOW how Interstate's Plastics Training qualifies you for success in the Plastics field.

PLASTICS AND SUPPLIES FURNISHED FOR 23 VALUABLE PROJECTS

INTERSTATE TRAINING SERVICE
Dept. C-2-D Portland 13, Oregon

Paint *STRIPES* with New "*PAINT PEN*"!

Makes Straight, Curved or Parallel Lines!

Just fill glass vial with any color paint. Use like a fountain pen to stripe furniture, bikes, autos, model planes, toys, linoleum, wall board. Beautiful, clean, crisp results every time, like professional painters. No experience needed to draw straight, curved, circular or evenly spaced parallel lines. Can't clog or smear. May also be used with glue, tempera, textile paint, or ceramic underglazes. Paints on wood, glass, plastics, metal, fabrics and paper. Lasts a lifetime. Only **$1** postpaid, complete with tip for 1/16 inch stripe. C.O.D.'s plus postage. Used by industry. Order your Paint Striping Tool TODAY!

$1.00

DEALERS
Master Paint Striping Tool packed in Display Cartons of 1 dozen. Fast, profitable seller. Write for discounts.

Attention All Home Craftsmen!
New Paint Striping Tool gives "professional" results every time, yet simple and easy to use as a fountain pen. Adjustable guide keeps lines straight as an arrow. Just as easy to make curves or freehand designs. Adds new beauty, finished look to everything you paint. Send $1 now.

New! "DOUBLE-STRIPE" MODEL Only $2.95

Newest paint striping invention. Makes DOUBLE stripes—one wide and one narrow or two wide or two narrow **at the same time.** Or adapt quickly for wide or narrow single stripe. Makes 5 combinations. FREE—Send postcard for complete information . . . or order now . . . $2.95.

WENDELL MFG. CO., Dept. 3-D
4234 Lincoln Ave., Chicago 18, Illinois

6 Other Complete Tools
Complete tools for 1/64, 1/32, 3/64, 5/64, 3/32 or 1/8 inch stripes, $1.50 each. Extra tips 75c ea. COMPLETE KIT with ALL 7 TIPS, $5.00. (Also 1/4" tip, only $1.00). **All tips interchangeable.**

OWN Your Own Business

$5 per hour

Clean and Mothproof rugs and upholstery "in the home," office, institution. If now employed you can operate in spare time and build a permanent full-time business. Alert dealers can gross $5 hourly profit on own service plus $3 on **EACH** serviceman. We locally train and assist you. Easy to learn—quickly established.

DURACLEAN cleans by absorption. No scrubbing, soaking or shrinkage. Dirt and grease vanish . . matted pile rises . . colors revive. Furnishings used again same day.

DURAPROOF makes fabrics resistant to moths and carpet beetles. Your service backed by an International Money Back 4 Year Warranty.

We furnish enough material to return your total investment. Easy terms. Send for **FREE** booklet TODAY.

DURACLEAN CO.
Duraclean Bldg., 4-184 Deerfield, Ill.

ALSO Eshelman SPORT CARS WORLD'S LOWEST PRICE 70 Miles Per Gal. Holds 1 Adult Free Literature.

ESHELMAN BOAT TRAILER

World's Lowest Price ONLY **$59**
Easy Load • Easy Haul • Easy Launch
Write for Catalog

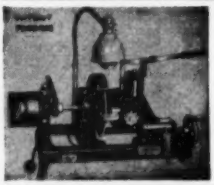
Top quality welded steel construction. Shipped complete with Hi-Speed wheels, tires, tubes, hitch, etc. Write

ESHELMAN CO., Dept. BT-94
119 Light St., Balto. 2, Md.; 33 N. Michigan Ave., Chicago 1, Ill.; 7070 Hollywood Blvd., Los Angeles 28, Cal.

ILLUSTRATED CARTOON BOOKLETS

Men, here are the small illustrated cartoon booklets of comic characters they're talking about. 20, all different, (and other offers) sent for $1 postpaid. No C.O.D.

GAY SALES, 448-L N. Prior, St. Paul, Minn.



Start a NEW BUSINESS!

or Add to your present Repair Business

SHARPEN DULL PIPE WRENCHES
PIPE TAPS & DIES
"GUM" CIRCULAR SAWS
Also MOTOR DRIVEN ROTARY HONE

Write for Information

J. C. MOORE INDUSTRIES
Box S 276, Fredonia, Pa.

FIREARMS & SWORDS

You don't want to miss our new thrill-packed catalog. Fascinating background and illustrations of 1800 authentic pieces. Exceptional values in hard-to-find items. For your 175 page catalog #29 simply send 50c to cover postage and handling with your name and address.

ROBERT ABELS, Box PS, 860 Lexington Ave., New York 21, N. Y.

When Writing To Advertisers
Please Mention Popular Science

RUPTURE

RELIEF...OR YOUR MONEY BACK

Write now for free booklet and pictures of rupture care. You can be helped...work steady, with low cost, easy to wear Web Truss, thousands satisfied.

WEB TRUSS CO. **Dept. PS-4, Hagerstown, Maryland**

WORLD'S GREATEST

CLASSIFIED

OPPORTUNITIES

MAKE MONEY

SAVE MONEY

Here are hundreds of opportunities offered especially to the readers of Popular Science Monthly. Read them. Answer them! You can make and save money.

POPULAR SCIENCE MONTHLY — 353 FOURTH AVE. — NEW YORK CITY 10

Classified Ads only 90c per word per insertion, payable in advance. Minimum ad 10 words. To be included in June issue, copy should be in our office by April 23. No cancellations accepted after April 15th. Address orders to O. K. Kelly, Classified Adv. Mgr.

1 AUTOMOBILES & MIDGET CARS

HI-Mileage-Speed equipment from the world's largest supplier. Dual manifolds, finned heads, electric doors, lowering sets, chrome panels, thousands of items for all cars. 1954 catalog 25c (illustrated literature free). Wholesale to garages. Newhouse Automotive Industries, Los Angeles 22.

YOUR Car Burn Oil? Poor compression? Slow Starting? Excessive cylinder wear? Holt's Piston Seal restores compression! Cuts oil consumption! Checks piston slap! Lasts 10,000 miles. This is the genuine Piston Seal others have tried to imitate—nothing like it! Forms self expanding seal around pistons. Compensates cylinder wear! Cannot harm finest engine. Easily installed; full directions enclosed. Free details. Treglown Company, 137 South Avenue, Fanwood 2, New Jersey.

FIBERGLAS automobile bodies. Build your own. Maurice Lannon's Fiberglass "How" book—$2.50. Information, materials catalog 10c. Airmailed—35c. Gem-O'-Lite, Box 6868A, North Hollywood, Calif.

CROSLEY Owner? Join with other Crosley owners—in every state—for fun and profit. We're cookin' on both burners! Crosley Car Owner's Club, 2101 Greenway, Charlotte, North Carolina.

FIBERGLAS Car bodies, boat hulls. Build your own. Handbook $1.00. Complete materials for construction. Custom Body Products, P.O. Box 1216, New Haven, Conn.

FREE motor magazines; automobile literature, old, new and foreign; glossy photos, dealer books; service manuals; offered with non-profit organization. Write today. Get on free mailing list. Auto Maniacs, Inc., Stockbridge, Michigan.

ANTIQUE Automobile Color Slides, 2x2. Illustrated Catalog Free. Universal Slide Company, Box 779P, Beverly Hills, Calif.

MAKE Your Own Furniture! New 256-page book "How to Build and Repair Your Own Furniture" shows you how to save big money making and repairing tables, chairs, bookcases, desks, cabinets, shelves, much more! Step-by-step directions, hundreds of illustrations. Only $2.49—money-back guarantee. Popular Science, Dept. 454C, 353 Fourth Avenue, New York 10, N.Y.

FIBERGLASS Body for midget sports car, for six foot driver—$88.00. Details free. Mystic River Sales, Mystic, Conn.

EXHAUST Header handbook, plans, details, completely illustrated. You can make, sell headers. Huge profits. Material at wholesale. Send only $1.25 for valuable book. Exhaust Supply Co., Dep't. N10, Box 6128, Lakewood, Calif.

2 AUTO SUPPLIES & EQUIPMENT

BRUSH Plating Outfits connect to a battery. No tanks or shop required. Free particulars. Gunmetal Co., Ave. K, Decatur, Illinois.

CUSTOM accessories headquarters. Electric push button doors—trunks, bull noses, custom grilles, speed dress-up equipment. 40 page catalog hundred photos—25c. Eastern Auto, 3319A South Grand, Los Angeles 7, Calif.

1954 EDITION. It's New! It's Different! Get world's largest Auto Accessory & Parts Catalog and save money. 132 pages. Over 50,000 items, including Hollywood Accessories Hi-Speed Equipment. Rebuilt Engines, all parts and accessories for all cars and trucks. We have that Hard-To-Get part! Jam-packed with bargains. Completely illustrated. Send 25c (refundable). J. C. Whitney, 1919-KB Archer, Chicago 16, Illinois.

NEW And Used Parts At Savings. Complete guaranteed parts service for all models cars and trucks, late or old. Largest in the West. Army parts specialists. No catalog—write for quotations. Fast Mail Order Service. Pioneer Auto and Truck Parts Co., 788 W. 13th Avenue, Denver, Colorado.

"FORD T" parts-engine and chassis. Parts for other old models too. Special parts made to order. (We buy surplus items). B. S. Wisniewski, Milwaukee 7, Wisconsin.

SAVE your life with amazing new "Torsion-Flex" Sway-Blizers! Stops sway, skid, slide. Postal brings free illustrated literature, gift offer. Sway-Blizer, 5434-B Higgins, Chicago 30.

STOP that "bird call" under the hood of your car. That "Squeak" is the fan belt slipping on the pulleys. Send 50c for a generous supply of Cling-Surface Fan Belt Dressing that stops the squeak. Results guaranteed. Cling-Surface Company, Dept. A, 1048 Niagara St., Buffalo 13, New York.

LIKE Miniature Television! View crankcase oil while driving. Check condition and level. Avoid costly repairs. Nationally famous attachment half price direct. Illustrated literature free. We-No-Nah Sales, Box 195, Winona, Minnesota.

INCREASE! Gasoline mileage Three to Five more miles per gallon. Guaranteed Gasoline Vaporizer, also Increases Power, Easier starting. $3.50. Turb-O-Vane, Stockton, Calif.

STOP that skip in Buicks, Olds, Pontiacs, Cadillacs! Burn wasted gasoline! Restore smooth full power with Spark-O-Liner. $3\frac{1}{2}$ million sold. Ask your jobber. Free catalog write Hove, 5606 Clinton, Minneapolis 19, Minnesota.

SENSATIONAL Free Trial Offers! Surplus stock of famous Gale Hall automotive instruments, brand new, original cartons! Try at our risk for seven days—then send payment or return merchandise! Professional Compression testers, originally $10.75, now $2.98! Engine analysis vacuum gauges, originally $12.50, now $4.55! Fuel pump testers, originally $8.10, now $3.09! Original Gale Hall motor condition/gasoline economy gauges for permanent dashboard mounting . . . originally $7.50, now $2.98! (Add 40c to each price for postage) Order Now! New England Surplus Sales, Dept. PS-4, Newburyport, Mass.

DRIVE a clean car. It's easy. Wiz-Wash cleans fast, easy, leaves no streaks. Ten packages $1, postpaid. Kingseal Chemical Co., 53 State Street, Boston 9, Mass.

SAVE gas! Positively guaranteed by automotive researchers' methods. Complete information, $2.00. Consumers' Service, Room 15, $522\frac{1}{2}$ J Street, Sacramento, Cal.

T Model Ford Parts, 1903 to 1932. 25c for new Catalogue. Richard M. Crocker, Sharon, Mass.

"AUTOMOBILE Accessories", for Free Trial! Write—Neher Industries, LaVerne 6, California.

BUY Wholesale nationally advertised auto supplies, thousands other products at big discount. Free "Wholesale Plan." American Buyers', 629-E Linden, Buffalo 16, N. Y.

CAR Burning oil? Losing compression? Try Clifford's Compression Seal. $2 postpaid. Clifford's Engineering, 1389 Seventh, Aurora, Illinois.

ELECTROPLATE autoparts, novelties, mirrors. Easy, inexpensive home processes. Free booklet. Tyco Metals, Box 13231-PC, Houston 19, Texas.

BIG Book combined experience and know-how of world's best mechanics. Factory and ace mechanics trade secrets to show you how. Write Valuable information Free. Scientific Electric Co., Box 2162BC, Cleveland 8, Ohio.

LACHAPELLE'S Treatment. Makes any gasoline motor better, even a brand new one. Ferns Products, 8120-D Walnut Dr., Los Angeles 1, Calif. Free data.

SILVER Ignition Points. Best contacts known. Hotter, faster spark. More speed and power. Write Scientific Electric Co., Box 2162BB, Cleveland 8, Ohio.

NOW! Vacumite the new revolutionary car vacuum cleaner cleans your car in a jiffy. Ready for instant use. No moving parts to wear out. Only $3.98. American Enterprises, Box 141, Boston 9, Mass.

AGENTS sell "Solder-Aid" commissions in advance. American Wax, 2422 W. Hutchinson, Chicago 18.

SLIDE rule figures your gas mileage each time you fill up. $1.00. Fenton, 7832 Juniper, Prairie Village, Kansas.

"ATTENTION" Run your car on natural gas. Plans $1.00. Kemerer Enterprise, 1308 Va. Ave., Dunbar, W. Va.

"SAVE, Order Direct"—America's Speed, Power, Custom Accessory Headquarters! 50,000 Items! Catalog plus Tuning Chart 25c (Literature Free). Almquist Engineering, Milford 4Z, Pennsylvania.

CHEVROLET Owners: Stop tappet noise with Kaye Tappet Silencers. Quality product. Easy to install. Complete set $3.95. Kaye Products, 2067C So. Layton Blvd., Milwaukee, Wisconsin.

SPEED Equipment Wholesale! Join Discount Club. Box 622A, Burbank, California.

INVENTION N-20 Chemical Cleaner Renew cooling system, Safe-use for weeks. Free "ABC of Cooling System", 25c sample cleaned piece, $2.90—Treatment. Wong Laboratory, Cincinnati 9, Ohio.

NEW!! Different!! Economy Safety catalog, featuring complete national selection of latest improved inventions. Fully illustrated . . . unconditionally guaranteed. Many free, free, send no money offers. 50c refunded on first purchase. Mehren Industries, 8666 West Pico Blvd., Dept. S-3, Los Angeles 35, Calif.

POPULAR SCIENCE OPPORTUNITIES

BATTERY Weak? Give it added life, power, with nationally famous, proved AD-X2. $3.00 postpaid. Sold on money back guarantee. State make, model and year of your car. Particulars free. Marbill Products, Ellicott City 2, Maryland.

STOP leaks fuel tank, metal boat, water tank, etc. Use the wonderful sealing tool made for U.S.A.F. Proved successful quickly repairing bullet riddled tanks. Eliminate costly tank removal or expensive welding. Money back guarantee. Ppd. No COD. 75c ea. 3 for $2. J&J Trading Corp., 1698 Webster Ave., New York 57, N. Y.

CONVERTIBLE Tops—A good present —Custom Made Black-Tan, $27.95; Florida Top Shop, 73258 Old St. Augustine Rd., Jacksonville, Florida.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The June issue closes on April 23. Write today for order blank and free copy of booklet "How To Make Money Out Of Classified Advertising". O. K. Kelly, Classified Adv. Mgr., Dept. 454, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

3 AUTO TRAILERS

BUILD your own trailer! Plans for all kinds. Illustrated catalog 10c. Jim Dandy, 125-S, Wausau, Wisconsin.

EXCEPTIONAL expanding eight foot trailer. Accommodates family of five. Build yourself. Literature 10c. Fra-Mar Company, Jones Avenue, Wilmington, Mass.

ASSEMBLE Yourself. Trailer Kits. Pick-up Coach Kit. Blueprints. Literature 10c. Comstock Trailers, 585-SK, Parsons, Kan.

4 MOTORCYCLES, BICYCLES AND SUPPLIES

RECONDITIONED motorcycles and motors. Chromium accessories. Complete stock Indian parts. Expert rebuilding. Fast service. Indian Motorcycle Sales, Kansas City 27, Mo.

VILLIERS motorcycle $45, Harley $40, electric automobile $55, two-cylinder Maytag $8, Briggs $5, Indian four cylinder engine $15. Four airplane tires $3. (Mailorder only). Send 25c for new catalogue Number 58 listing these and hundreds of other bargains in new and used midget cars, motorscooters, parts, plans for home-builders etc. (35c by first class mail.) Midget Motors Directory, Athens, Ohio.

2½ H.P. Whizzer $18.50; Midget car $15.00; Doodlebug motorscooter $37.50; homemade motorscooter $6.00. Send 25c (35c first class mail) for catalog #24 jammed with sensational bargains in wheels, motors, motorscooters, midget cars, motorbikes, construction plans, etc. Gail, 1313 Jefferson, Toledo, Ohio.

REBUILT gasoline engines $17.00 to $37.00. Cauffiel Motor Industries, Temperance, Michigan.

5 AVIATION

AVIATION Surplus Bargain Catalogue. One Dime. Ort, Thomasville 42, Penna.

PROPELLERS, plans, kits for air boats, snow sleighs. Catalog 25c. Banks-Maxwell, Box 3301G, Ft. Worth, Texas.

6 BATTERIES, GENERATORS, ETC.

EDISON Nickel odorless storage batteries, 12 to 600 ampere hour. Any voltage. Long guarantee. Literature. Hawley Smith Co., Croton Falls 2, New York.

7 ELECTRICAL SUPPLIES & EQUIPMENT

LAMPS—25c brings bargain catalog showing all parts for repairing, building. Contains instructions for electrifying vases, oil lamps, etc. Gyro Lamps, 5402B Clark, Chicago 40.

ELECTRIC Motor Supplies, Wire, Insulation, Varnish. Electric Motor Service, 308 Delaware, Mason City, Iowa.

TELEPHONE and Communication Wire. Two-Conductor Copper-Steel mile reel $16.00, half-mile $9.00. Low cost Telephones and wire available. Free folder. Loris Sales, Box 1895-A, Sacramento, Cal.

ELECTRICIAN'S tool for making solderless connections that enables anyone to do "professional-like" jobs. Crimps terminals and connectors. Splices, cuts and strips wire. Shears bolts without damaging threads. Complete kit; Tool, Terminals, Connectors and Insulators, formerly $5.00, now $3.95 postpaid. Aircraft Marine Products Inc., 1331-C, American Building, Cincinnati 2, Ohio.

ELECTRIC Pencil: Engraves all Metals. $1.50. Beyer Mfg., 10511-C Springfield, Chicago 43.

8 WELDING, SOLDERING

WELDERS — electric — various models, $28.50 to $235.00 direct from manufacturer. Free literature. Champion Welder Mfg., 193PS Centre St., New York 13, N. Y.

"BUILD-Ur-Own" a.c. welder and a.c. power plant with a good used engine and low cost Hobart generator. Weld anywhere and supplies 5KW stand-by power for any emergency. Write Hobartweld, Box P-443, Troy, Ohio.

WELDERS—110V AC DC complete $9.95. Free information. S&W Enterprises, P.O. Box 154, Independence, Missouri.

A.C. Welders. Four Sizes. Lowest Prices. Free Literature. Holgerson's Serv., Canton, Kan.

ELECTROPLATING outfits $4.95. Gold $5.95. Ideal for small articles. Hobby or business. Free information. Capitol, 4213-C Queensbury Road, Hyattsville, Maryland.

WELDERS 110V, $29.50 220V, $49, combination $54. Morris, 1070 Inner Drive, Schenectady, New York.

9 MACHINERY, TOOL SUPPLIES, ETC.

ALLEN One Ton Power Bench Type Punch Press, $97.50. Circular. Allen, Dept. PSB, Clinton, Missouri.

BIG Factory Catalog! Buy direct—Save Middleman's profits; hundreds of labor saving tools and equipment—tremendous savings. Send 10c. Master Mechanic Mfg., Dept. C-68, Burlington, Wisconsin.

POWER tools, equipment wholesale prices. Free bulletin. Homecrafters Cooperative, Grand Rapids 6, Michigan.

CENTERLESS grinding attachment for 6" lathes. $29.50. Others. Valtool, 14 Stephen Pl., Valley Stream, New York.

TREMENDOUS tool savings send 25c for 80 page illustrated catalog. Coastal Abrasive, Dept. PSC, 47 Howard Street, New York 13, New York.

10 ENGINES, MOTORS, ETC.

WINDING Data, listing 225 motors, single and three phase, $1.00. Motor Data, Box 7631, Kansas City 28, Mo.

ALTERNATING Current Generators 750 Watt $38.50, 5000 $185. Motors ½ horse $15, ¾ $22, 1 $35. Butler, 1885 Milwaukee, Chicago 47.

REBUILT Gasoline Engines. $17.00 to $37.00. Cauffiel Motor Industries, Temperance, Michigan.

POWER mower kits. Engines. Motorbikes. Lenco, Box 436, Danville, Illinois.

11 BOATS, OUTBOARD MOTORS

BUILD marine engines with Federal Conversion Kits. Federal Marine Motors 9011 Cottage Grove Ave., Chicago 19, Ill.

NEW, used rebuilt marine motors. Marine conversions, fittings. Free Catalog. Stokes Marine Supply, Dept. 23, Coldwater, Mich.

OUTBOARD Motor Parts—New—Used for all makes. Send stamp for price quotation, listing parts needed. Outboard Motor Mart, Inc., 229D State Street, Boston, Massachusetts.

MARINE Conversions—Willys to Cadillac. Catalogue and conversion hints free. Barr Marine Products, 2709B Castor Avenue, Philadelphia 34, Pa.

"HOW To Make Your Old Boat New With Liquid Glass" and "How To Build Your Own Fiberglass Boat". These 2 illustrated manuals show step-by-step method. Both for 25c from Marine Div., Dept. MD-102, Castolite, Woodstock, Ill.

FULL size, cut-to-shape Boat Patterns. Blueprints. 7½-38 feet. New 1954 illustrated "Build A Boat" catalog of 50 naval architect-designed Cruisers, Runabouts, Sloops, Skiffs, Outboard Boats, Sailing, Racing, Houseboats. 25c. Marine Hardware Catalog. $1.00. "How to Build Boats" book. $1.75. Polywog Houseboat Plans, $12. Cleveland Boat Blueprint Co., Dept. A-77, 9400 Steinway, Cleveland 4, Ohio.

GET our big 224 page boat hardware and equipment catalog. Send $1.00 for cost of handling, refunded with first order. Garland Frasher Marine Sales, 2626 Fifth Ave., Huntington, West Virginia.

SAVE 2/3 Cost. Assemble your own boat. We furnish parts. No experience necessary. Rowboats, Cruisers. Illustrated Catalog 25c. Midwest Boat Company, Menomonee Falls 1, Wisconsin.

SUBPLANE—Frogman subsurface aquaplane, circular 25c, plans $2.50. Complete $75.00. Service Engineering, 7959 Sparling Road, Goodells, Michigan.

LESS than wholesale prices. Crackerbox plans $6.50 value, $1.50. V-8 Ford water-cooled manifolds $60.00 value, $42.50. Speedboat and kit boat builders marine hardware catalog 35c refundable. Debbold's Supply, Lynwood 22, Calif.

STEERING Wheels, Windshields from $7.95, hundreds polished fittings. Lowest prices. Water skis, Saucers, Boards. Bargains galore. Marine, Box 681-P, Mendota, Minnesota.

NONCORROSIVE screws, studs, nuts, washers and specialties reasonably priced. R. Press, 1012 Maple Street, Conshohocken, Penna.

BUILD a 21 foot plywood outboard cruiser, also other plans including a sailing catamaran, literature free. Wild Hauber, 2451 18th Avenue, No., St. Petersburg, Fla.

FIBERGLAS lifetime boat covering. Average 12 foot boat costs only $27.50! Free information. Northwest Fibr-Glass Company, 1531 North Morgan, Minneapolis 11, Minnesota.

BUY Wholesale nationally advertised outboards, thousands other products at big discount. Free "Wholesale Plan." American Buyers', 628-E Linden, Buffalo 16, N. Y.

MARINE conversions for Ford and Jeep engines. Catalog 10c. Lehman Manufacturing Co., 972A Broad St., Newark 2, N. J.

FIBERGLAS permanent boat coating. Maurice Lannon's Fiberglass "How" book —$2.50. Complete catalog—10c. Airmailed —35c. Gem-O'-Lite, Box 6868B, North Hollywood, California.

AIR Boat, snow sleigh propeller, plans, kits. Catalog 25c. Banks-Maxwell, Box 3301J, Ft. Worth, Texas.

MIYOT-20' Cruiser (Outboard). Now available for home construction! Blueprints $9.95, Literature 15c. Miyot, Box 73, R1, Lyndon, Kentucky.

FOAM rubber boat mattresses made to order—Free catalog—Perma-Foam, 140-A Main Street, East Orange, New Jersey.

AIRPLANE Floats (Pontoons) for Boats. Catalogue 10c. Ort, Thomasville 422, Pa.

BUILD Beautiful fiberglas-plastic boats without using molds. New patented method. Write Speedcraft, 2450 Emerson, off Square Lake Road, Pontiac, Michigan.

BOAT Kits, plans and patterns for America's fastest and finest outboard racers, runabouts, hunting skiffs, canoes, and fishing boats. Illustrated literature 25c. Schneider Boat Co., Dept. PS, 1913 West Vliet, Milwaukee 5, Wisconsin.

CRUISER Plans—21' inboard, 15'-17'-20' outboards. Specify requirements for literature. Glen Marine, Box 568, Compton, Cal.

POPULAR SCIENCE OPPORTUNITIES

NEW! Motor-Porter. Outboard Carrier. Factory to you $14.95 F.O.B. J.B. Sabourin Co., Norton, Mass.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The June issue closes on April 23. Write today for order blank and free copy of booklet "How To Make Money Out Of Classified Advertising", O. K. Kelly, Classified Adv. Mgr., Dept. 454, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

12 BODY-BUILDING COURSES, JIU JITSU & ATHLETIC EQUIPMENT

BUILD Powerful arms, chest, shoulders. 22 exercises, $1. Fonsad Studio, Box 601-C, 1100 Market Street, Wilmington 99, Del.

BE Healthier, Stronger! Illustrated body-building course, $1.00. Ol-Te-Co., 2347 Lalemant, Cleveland 18, Ohio.

GREAT Strength easily obtained. Send $1.00 for complete course and apparatus. Noticeable results guaranteed in 7 days, or $1.00 refunded. Joseph Dryer, Box 5527-Z, Chicago 80.

BARBELLS, Dumbbells, Exercise equipment. Courses. Free booklet. Good Barbell Co., Reading, Penna.

14 FIELD GLASSES, TELESCOPES

FREE Catalogue! Thousands war surplus optical bargains. Lenses, Prisms, Telescopes, Binoculars, etc. Send $1.00 for 10 Lens Hobbyist Set and Project booklet. G. Jaegers, 691 West Merrick Road, Lynbrook, New York.

WAR Surplus Bargains. Binoculars, Telescopes, Sextants. Millions of Lenses, Prisms, Reticles, Eyepieces, Objectives, etc. Mail 10c for Big "Catalog CN." Send $1.00 for Stock CN-10-piece Lens Kit and Big Instruction Booklet. Edmund Scientific Corp., Barrington, New Jersey.

SAVE 25%! Get interesting facts. Free 52 page Binocular, Telescope Catalog. $3.95 to $250.00! United, 9043 S. Western, A-9016, Chicago 20. Dealers Wanted.

BINOCULAR specialists, all makes repaired. Authorized Zeiss, Hensoldt dealer. Tele-Optics, 5514 Lawrence, Chicago 30, Illinois.

IMPORTERS' amazing prices, binoculars, microscopes, gunscopes. Free trial. Folder "Binocular Selecting", pricelists free. Dealers wanted. Prentiss Importers, Mercury Bldg., West Los Angeles 25, Calif.

BINOCULARS—Telescopes, Microscopes. Terrific values $3.98 up. Request Free-Money saving catalog. Criterion, Hartford, Conn. Dept. S20.

SPECIALISTS. Used, new microscopes. Prepared slides. Supplies. Telescopes. Free illustrated catalog. Nassau Optical, 9 W. Greenwich, Roosevelt, New York.

REFLECTING Telescopes, completely assembled. 60X, $29.75. Guaranteed Observatory clearness. Free information. Skyscope, 475 Fifth Avenue, New York 17.

REFLECTOR Telescope Kits from $6.25. All parts designed and built at our Hoboken factory. Mirror Cells, Diagonals, Focusing Mounts, Tri-Pods, Tubing, Oculars Fully Guaranteed. Free Illustrated Catalog. Send all inquiries to Esco Products, 1428-B Willow Avenue, Hoboken, New Jersey. Showroom—134 West 32nd Street, New York.

LOWEST prices all sizes Binoculars, Telescopes, Microscopes 8x30 $32.00, free catalogue. Joe's Binocular Sales, 4827 Second Street, Detroit 1, Michigan.

TELESCOPE kits and accessories, mirrors aluminized, ground to order, instructions 10c. Garth Optical, Box 954, G.P.O., N.Y.C. 1, N.Y.

PANORAMIC Telescope, Army Surplus, $12.95, original government cost $800.00. Send for Free Picture. Farber Products, 226-P Lafayette St., New York 12.

GIANT Astronomical telescope completely assembled with six ft. tripod. Includes 45X, 75X and 100X eyepieces. $15.00. 400X telescopes easily made. Includes focusing tube, erector, 5 lenses and instructions—$3.75. Suffolk Science Service, Riverhead 4, New York.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The June issue closes on April 23. Write today for order blank and free copy of booklet "How To Make Money Out Of Classified Advertising", O. K. Kelly, Classified Adv. Mgr., Dept. 454, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

15 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY, TRAPPING

180 PROFUSELY illustrated pages, antique pistols, swords, daggers, armor, etc. 50c. Robert Abels, PS860 Lexington Ave., New York 21.

CATFISHIN' Handbook. Secrets, tested techniques! 39 pages. $1.00. Fisherman's Notes, Marshalltown, Iowa.

GOLF Balls, $1 quality, liquid centers, six $4.50, dozen $8.25. Bar-Way Company, Box 100, Plymouth Meeting, Pa.

PANFISHERMEN—12 hackle flies #10—$1.00, prepaid. Ramsey Bait Box, Ramsey, Illinois.

CAST Iron Sinker Molds—for making your own sinkers. Free illustrated booklet. Reading Instrument Co., Box 78, Reading, Pennsylvania.

MOLDS for Fisherman's Sinkers, Jigs, Squids. Casting and Spinning Lures. Free Catalogue. Sweet's Molds, Tonawanda 3, New York.

5,000 BARGAINS, firearms, binoculars, war relics, catalog 50c. Smith Museum, Runnemede, N. J.

IMPORTED, Stilettos, Daggers, Throwing, Pocket, Hunting knives, etc. Free catalog. J. D. Clinton, 94 Church, Mt. Clemens 3, Michigan.

GUNS??? Ask Agramonte—Send 50c—New 1954 Catalog—Colts, Kentuckies, Rarities, Sporting Guns, Agramontes, Younkers 2A, New York.

CALL Elk, Deer, Coyotes, Fox, Cats, etc. Original Animal Calls, Burley, Idaho.

DIVING, Spearfishing. Exclusive handbook details use construction latest equipment. Send dollar to Riley, Box 475A, Huntington, New York.

SWIMMERS! Send $3.95 for Imported French Mask, Skin Divers' Catalog 25c. Aquafun, Davenport 5, Iowa.

BUY Wholesale nationally advertised sporting goods, thousands other products at big discount. Free "Wholesale Plan." American Buyers', 627-E Linden, Buffalo 16, N. Y.

FREE Catalog: Flies, Lures, Mustad Hooks, Fly Tying, Lures, Spinner, Rod Making Materials, Nylon Coils. Supreme Mfg. Company, Amarillo, Texas.

SPORTER stocks semi-finished for Arisakas, Enfields, Mausers, Springfields, Catalog 10c. Banks-Maxwell, Box 3301H, Ft. Worth, Texas.

JAP rifles altering American shells $6.00, catalog 5c. TP Shop, West Branch 19, Michigan.

SAVE 50% on finest bows, arrows, complete bowhunting outfits, etc. Free Catalog and "How to Hunt with Bow and Arrow" booklet. Send 25c for handling. Malibu Archery, 3156-BA 8th Street, Los Angeles 5, California.

SPINNING Lures! 5-polished brass spoons & all fittings you assemble. All for $1.00. E. L. Wright, Box 115, Fayetteville, New York.

OVER 500 guns, modern, obsolete. List 10c coin. Ed Howe, 26 Main, Coopers Mills, Maine.

16 CAMPING EQUIPMENT & TENTS

AIR Mattresses, sleeping bags, tents (direct from manufacturer), camping equipment. Low prices. Free 80 page catalogue. Mor-San Sales, 10-21G 50th Avenue, Long Island City 1, New York.

17 DOGS, BIRDS, HAMSTERS, RABBITS & PETS

MAKE Big Money! Raise Chinchilla Rabbits. Cash Markets Supplied. Write Today! Rockhill Ranch, Sellersville 16, Pa.

ORIGINAL Drawing made from favorite photograph of your Dog. Everlasting keepsake. Write for free information. Earle Littlejohn, 201-PS East Earle, Greenville, South Carolina.

PREFAB Dog Houses. Free Catalog. Webb Company, 184-CPS, Drexel, Mo.

HAMSTERS—Golden; young, $4.00 pair; fully developed, $5.00 pair. Request prices on rare albinos. Adirondack Hamstery, Prospect 9, New York.

CHINCHILLAS (no rabbit) easily raised. Profitable. Big future. Terms. Cliff's Chinchillas, Ithaca, Michigan.

RAISE moneymaking Angora, New Zealand Rabbits. Particulars free. White's Rabbitry, Jackson, Michigan.

GUINEA Pigs. Amazing moneymakers. Booklet free. Taylors, B426B, Hapeville, Georgia.

CHINCHILLAS rented, offspring bought. R. Rau, Route 2, Jeannette, Pennsylvania.

1000 BRED Mink—Booklet, Pen Plans 20c. Lake Ontario Ranch, Gravel Road, Webster, New York.

GROW Mushrooms, Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 177, 2954 Admiral Way, Seattle, Washington.

FORTUNES made raising crickets and fishworms sell by mail—complete instructions—$1.00. Large breeder worms $5.00 per 1000. Postpaid. Carter Worm Company, Plains, Georgia.

RAISE Fishworms—Highly profitable! Illustrated booklet explains raising, feeding, marketing, shipping. 25c. Ozark Worm Farm-V, Willow Springs, Missouri.

PET red squirrels. Breed others. Dewey H. Balch, Castleton, Vermont.

ALBINO and Golden Hamsters. Cages, supplies. Free Information. Circle S. Hamstery, Box 183, Claymont, Delaware.

18 FROG RAISING

JUMBO Frog Raising Profitable Information. Free. Vol Brashears, Berryville, Ark.

19 FARMS, OTHER REAL ESTATE

FARM-Ranch Opportunities. Favorable conditions. Washington, Minnesota, Montana, Idaho, Oregon, North Dakota. Literature, farm descriptions. Specify which state. J. W. Haw, 120 Northern Pacific Ry., St. Paul 1, Minn.

CALIFORNIA Ranch Lands. 50c to $5 acre minimum bid. Farm-ranch-hunt-fish-retire. 10c brings illustrated land catalog, outline maps. Tax Land Sales, Box 2350BX, Hollywood 28, Calif.

FLORIDA'S choicest lakefront lots. Excellent fishing—hunting. Eustis-Deland highway. $10 monthly without interest. Free literature. Roepke's, Eustis, Florida.

NEW Strout Catalog, just out! Farms, Homes, Businesses, 34 States, Coast-to-Coast, over 3000 bargains described. Mailed Free. World's Largest; 54 years Service. Strout Realty, 255-ZB 4th Ave., New York 10, N. Y.

GOVERNMENT Land. Homesteads, Leases. 170,406,160 acres vacant, public land 24 Western States. Information: Area by states, homesteading, lease, 5-a tracts, minerals, latest laws, vet preference, etc. $1.00. Lands, Box 503, El Reno, Oklahoma.

POPULAR SCIENCE OPPORTUNITIES

COME to Houston now. Get your delightful home here in popular suburbs of America's fastest growing city. Choice homesites only $345 payable $15 monthly. Excellent water, splendid soil. Grow oranges, berries, vegetables, poultry. Many concerns here need more employees at good pay. Free booklet. Nathan Wood, Box 413, Houston, Texas.

WE have cash buyers for all kind Real Estate. Free lists. Toole's, Box 84, Evansville, Indiana.

SOUTHERN California—Solve your vacation, health, retirement and investment problems forever in favored location. In nine years this area has grown from 64 persons to a population of nearly 23,000. Payroll from one permanent installation alone is approximately $2,000,000.00 per month. Present growth and future opportunities are tremendous. City residential lots near center of town with streets, water and electricity—in and paid for, full price $400.00, payable $10.00 down and $10.00 a month and no interest. Offer definitely limited, write at once. Free details mailed. "California in 54," 836 Crenshaw Blvd., Dept. A, Los Angeles 5, California.

SELLING village retirement home like rent. Information. Perry, Breierhill, Pa.

LAND appraisal simplified. Evaluation sheet complete with instructions 25c. Northwestern Farm Service Co., Luverne, Minnesota.

20 TREES, SHRUBS, ROOTS, HERBS

GINSENG, Goldenseal roots bring $2.00-$12.00 pound. Full Information. F. G. Collins, Viola, Iowa.

GARDENERS, Florists, Clubs. Free samples. Sheill, 29205 Northwestern, Birmingham, Michigan.

GROW Amazing "Sensitive Plant." Only plant known that recognizes people! Leaves fold when touched by strangers! Seeds and instructions $1.00—Guaranteed. Magic Plants, P. O. Box 813, Huntington Park, California.

RAISE Mushrooms anywhere. Tremendous profits. We supply everything. Postcard brings instructions and free spawn sample. Mushroom Supplies, Box 475-M, Wilkes-Barre, Penna.

21 POULTRY & SUPPLIES

RAISE pheasants on $100 week plan. Little capital and space can make you independent. Free details. Great Central System, Columbus 6, Kansas.

22 PROFITABLE OCCUPATIONS

DETECTIVES Earn Big Money. Excellent opportunity. Detective Particulars free. Write Wagoner, P-125 W. 86th, N. Y. 24.

"HOW to Make Money With Home Workshop" describes amazing methods used by hundreds of successful craftsmen. Tells what to make. How to sell workshop output spare time. Write at once for details. Craftsman, 115B4 Worth St., NYC.

WANT A Diesel Job? New Opportunities to increase income. Higher Pay. More Money. We can help you Qualify. Tools. Shop method home training. Write today! Diesel, Tractor, Heavy Equipment Division, Interstate Training Service, Dept. B2-D, Portland 13, Oregon.

$10,800 PROFITS! Your Own Mailorder Business! No Risk! "Success Plan" Free! Treasury, 709 Webster, New Rochelle P-22, New York.

$500,000 BY mail from home. Free Folder. Publicity, Kalamazoo 65EM, Mich.

COST Of Things Going Up faster than your income? You can make more full or part time as a Rawleigh Dealer. Write for full particulars. Rawleigh's, Dept. D-RR-PSC, Freeport, Illinois.

$5000 FROM Half Acre growing Ginseng, crop bought. Particulars 10c. Associated Growers Sperling, Manitoba.

TYPISTS! Moneymaking home business. Copyrighted Instructions 50c. Continental Publishers, 1332 So. 61st, Milwaukee 14, Wisconsin.

FOREIGN Employment Construction Work. If interested in foreign projects with high pay, write Foreign Service Bureau, (Dept. P.S.), Metuchen, New Jersey.

FREE! "301 Profitable Small Businesses!" Amazing shoestring plans! Work Home! Start Sparetime! Deumant Surveys, Kenmore 23-T, New York.

ADDRESS advertising postcards. Must have good handwriting. Lindo 504, Watertown, Mass.

BUY Wholesale thousands nationally advertised products. Up to 50% off. Write for free plan. Public's Wholesale Buyers Guide, 14A Box 247, New Braunfels, Texas.

WELDING Pays $$$. Learn easily at best equipped school in country. Nonprofit School with low cost training. G.I. approved. Write Hobart Trade School, Box P-442, Troy, Ohio.

MUSHROOMS grown boxes, barrels. Manureless process 50c. Spawn $1.00. Gardens, 553 William, Winnipeg, Manitoba.

SET Rhinestone Jewelry. Easy moneymaker. Catalog, instructions 25c. Bergen Arts, 1288 Main, Hackensack, New Jersey.

BUY Wholesale thousands nationally advertised products at big discount. Free "Wholesale Plan." American Buyers, 628-S Linden, Buffalo, New York.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 Lb. We paid Babbitt $4,165 in few weeks. Free Book. Washington Mushroom Ind., Dept. 101, 2954 Admiral Way, Seattle, Wash.

FREE Book "505 Odd, Successful Businesses." Work home! Expect "Odd"! Pacific—37C, Oceanside, Calif.

PANNING Gold prospecting catalog, listing maps, mineral books, gold pans, panning lesson free. Old Prospector, Box 729D2, Lodi, California.

BUILD luggage and cases at home. We sell your products. No special equipment needed. Free details. Casecraft, 805-X8 Sunset Blvd., Los Angeles 12.

HAWAIIAN Leaf produces plants without soil or water—beautiful flower sprays, 3 for $1.00. Polynesian Plants, Dept. PS-4, 1244 Nakuina, Honolulu 17, Hawaii.

SELF-Service-Garage. How to start this profitable business in a small way. Free literature. Box 772-S, Benicia, Calif.

"EVERYBODY Likes Candy." Learn to make professionally. (Our 43rd year.) Ragsdale Candies, East Orange, N. J.

PRINT without a Printing Press! Amazing New Method! Print colorful signs, banners, cards, posters, glassware—anything at home. Big profits $ $ $ $ $ Opportunity! We supply everything. Beautiful Sample, Home-Business Plan Free! Write Screen-Print Company, Los Angeles 15, Calif.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The June issue closes on April 23. Write today for order blank and free copy of booklet "How To Make Money Out Of Classified Advertising". O. K. Kelly, Classified Adv. Mgr., Dept. 454, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

23 BOOKS & MAGAZINES

SPARETIME Profits Taking Subscriptions. All Magazines. Wholesale Catalog Free. Cassell Agency, Westfield 1, N. J.

GOOD Used Books, 50c-$1.00. Free lists. Editions Dept. PS, Hempstead, New York.

ONLY book in existence on Democratic-Scientific Social Engineering. Noncommunist, nonfascist. $1.50 postpaid. Institute Of Social Engineering, 2623 Lawrence Avenue, Chicago 25, Illinois.

BACK number magazine specialist, specific requests. Ellis Chalfin, 410 East 17 Street, Brooklyn, New York.

BOOKHUNTERS! All Subjects. Send Wants! Jaher Book Service, 620-K East 178 Street, New York 57.

BOOKHUNTERS! Scarce, unusual, miscellaneous books supplied. Atlantic Book Service, 10 Cedar, Charlestown 29, Mass.

ATHEIST books. Catalogue free. Truth Seeker Co., 38 Park Row, New York 8.

LARGE Family Bible. Retail $34.95. Your Price $24.95—Satisfaction Guaranteed—Universal Bible Supply Service, Box 284, Nashville, Tennessee.

LAF-A-Lot Jokes, Stories, Interesting Book. Makes lovely gifts. $1.00. Laf-A-Lot, 1709 Polk, Wichita Falls, Texas.

ANCIENT lost "Books of Moses" revealed! $1.00—plus free gift — strange magic symbol engraved on simulated gold amulet. Box 83, Homecrest Station, Brooklyn 29, New York.

FLYING Saucer photos, clippings, landings, printed in Saucer Review. Five issues, $1.00. Box 853, GPO, Brooklyn 1, N. Y.

NATIONAL Geographic Magazines 1888-1952. Any issue. Periodical Service, Box 465-PS, Wilmington, Delaware.

WORLD'S smallest Bible 50c. Three, $1.00. Empire's, Box 301, Amesbury 8, Mass.

BOOKS! New and old, your wants supplied. General Catalog Free. The Mail Order Bookstore, 1336-S SW Hall, Portland 1, Oregon.

MIDGET Bible, size of stamp, beautiful cover, 200 pages, pictures, money-back guarantee, $1. James, Box 1281, Lubbock 2, Texas.

24 HYPNOTISM

FREE Illustrated Hypnotism, Selfhypnosis. Catalogue. Write: Hypnotist, 1324 Wilshire, Hollywood 17P, California.

HYPNOTIZE or no fee guarantee. International teacher will instruct groups hypnosis/autosuggestion your town. If you can organize group write: Franchel, Palmyra, New York.

LEARN Hypnotism. You can—anyone can in one week with our unbelievably simple course. Free details airmailed in plain sealed envelope. Specco, Box 345-K, Wilkes-Barre, Pa.

HYPNOTIC Telepathy Amazing New Discovery! Read the minds of others. Complete Course. Clearly written. Only $2.00. Hypnotic Telepathy, Rt. 1, Box 313K, Alexandria, Virginia.

MECHANICAL Hypnotist, new invention causes trances immediately. Instructions, secrets included. $2.00. Clik, G.P.O. Box 1312, New York 1.

AMAZING record! Hypnotizes; transfers control to you. Instructions, $2.95 ppd. Information free. Hypno Records, Dept. P, Box 405, Hermosa Beach, Calif.

AUTOHYPNOSIS folio, "25 Hypnotism Lessons" and catalogues. 25c. Lloyd Collins, Appalachia, Virginia.

25 MAGIC TRICKS, PUZZLES, ETC.

MAGICIANS, Gamblers books, supplies exposed. Free Catalogue. Book, Box 671, St. Louis 1, Mo.

500 TRICKS. Douglas famous 120-page Catalog, only 10c. Fastest service to magicians for 30 years. Send 10c today. Douglas Magicland, Dept. 2, Dallas, Texas.

VENTRILOQUIST dummies—$5.95 to $295.00—Complete Ventriloquism Course $39.50—Dummy catalog 25c. Write! Fred Maher School of Ventriloquism, Dept. PCL, Box 36, Kensington Station, Detroit 24, Michigan.

90 PAGE Novelty-Magic catalog with surprise gift, 25c. Allen, Dept. PST, Clinton, Missouri.

BE a Magician. Large professional magic catalog of latest tricks 35c. Ireland, P-109 North Dearborn, Chicago.

ENTERTAIN With Magic—Hobby or Profession. Write—Marsh's, 237 W. 11th, Columbus 1, Ohio.

POPULAR SCIENCE OPPORTUNITIES

2500 TRICK Catalogue (512-pages), pocket, parlor, stage. World's Finest Magic. Catalogue $2.00 (dollar trick included free). Kanter's, S-1311 Walnut Philadelphia 7.

FREE Magic & Novelty Catalog, includes 14 wonderful magic tricks fully illustrated and described. Send only 10c to cover cost of mailing. Read all about our Free Gift Offer. Chicago Magic Center, PS-4, 19 W. Randolph Street, Chicago 1, Illinois.

FREE Catalog. Best Magic, Practical Jokes, Top Hat Magic. Evanston 22, Ill.

"BE popular amaze friends 52 page book of easy mystifying card tricks. Send $1.00." Allan Thoresen, Box 405, So. Acton, Mass.

LEARN magic. Free details and trick. Gateway Press, 414 2nd Ave. So., Clinton, Iowa.

"VENTRILLO" Professional Voice Thrower and Catalog 25c! Box 971-PS, Philadelphia.

DOLLAR Magic Set Free with Catalog 25c. 4462-PS Germantown, Philadelphia.

FIFTY Samples Tricks, Jokes, Novelties. $1.00! Manufacturers, 1746-PS Market, Philadelphia.

26 COIN COLLECTING

WANTED—1894-S Dime pay $1.000.00. 1901-S quarter $20.00 to $150.00. 1913 Liberty head nickel $1500.00. Certain Lincoln cents $20.00. 1885 Trade dollar $750.00. Certain Buffalo nickels $7.50. 1922 Half dollars $3.00-$45.00. Hundreds of others. Know their true value. Large illustrated complete guarantee buying catalogue 25c. Need $100,000.00 worth of rare coins. Help us find them. Earn $100.00 to $200.00 weekly selling our catalogues to friends, neighbors, storekeepers, etc. 10 regular 25c catalogues $1.00. 100-$9.00, 600-$50.00 postpaid. We guarantee to return quarter to anyone who sells us $5.00 worth coins. Worthycoin Corporation, Leaders of Numismatic Quotations (D-103), Boston 8, Massachusetts.

GET Profit and Pleasure in collecting old coins. Send 10c for 56-page illustrated coin catalog. You'll be delighted with it. Send for it now. B. Max Mehl, 374 Mehl Building, Fort Worth, Texas. Largest rare coin establishment in U. S. Established 54 years.

FREE! Foreign coin, banknote and Coin Collectors' Illustrated Catalog to approval service applicants. Send 3c postage. Tatham Coin Co., Springfield-50, Mass.

INDIANHEAD cents, 18 different dates for $1.00. Hudson Coin and Stamp Exchange, 3469 Hudson Blvd., Jersey City 7, New Jersey.

OLD Money Wanted. Will pay Fifty Dollars for nickel of 1913 with Liberty Head (no Buffalo). We pay cash premiums for all rare coins. Send 4c for Large Coin Folder. May mean much profit to you. Numismatic Co., Dept. 30, Fort Worth, Tex.

JAPANESE Invasion notes for U.S. 1c to $1,000.00 set $1.00. 100pp. Catalogue, 25c. Shultz, Salt Lake 19, Utah.

WORLD'S Greatest Magazine for coin collectors and wooden nickel 10c. Lawrence Brothers, Anamosa, Iowa.

YOUR Foreign Coins Are Worth Money! New 1954 Fell's International Coin Book. Tells how to identify, learn exact value, etc. of every coin ever minted whether or not you know country of origin. Also includes selling, speculating, investment, buying, etc. Clothbound, profusely Illustrated. Send No Money. Pay postman $2.00 (plus postage) or send $2.00 (postpaid) refundable. Fell Publishers, 386-B4 4th Ave., N. Y. C. 16.

100 DIFFERENT Foreign Bills—$1.00. Free list. Dwight Musser, Dunbar, W. Va.

HAWAIIAN shell money collection, 50c postpaid. Pupuhale, 252 Dewey Way, Honolulu, Hawaii.

FOREIGN Coin Collections 50c—$1—$2 Each. Descriptive Lists Free. Webb, 2200 Quintara, San Francisco 16, Calif.

50 COINS and bills, $1.00. Oddehon, Box 482, St. Louis, Missouri.

COIN Magazine, 100 pages. Sample 30c. Numismatic, 7320 Milwaukee, Chicago 31.

LARGE cent, 2c, 3c, all for $1.00. Bargain list included. Delmaco, Box 1123B, Wilmington, Delaware.

1925-P DOLLARS: about uncirculated $3.95; brilliant uncirculated $5.95. 1954 Carver $1½ set $9.95. Giant bargain coin catalogue 35c. Bebee's, 4514 North 30th, Omaha 11, Nebraska.

10 DIFFERENT Belgian and Dutch coins $1.00. Postage, insurance included. Hustin, 5628 Elmwood Avenue, Philadelphia 43, Pa.

28 STAMP COLLECTING

WANT more for your dollar? Try our low priced, neat attractive approvals. Books of 500 and 1,000 U.S. or foreign. We also have a premium card which will earn you free albums. Write today. Roseland Stamp Co., Dept. B-33, Spring Lake, Mich.

FREE—Complete set of Famous Americans Flags, Parks and Presidentials to approval buyers. Send 5c for 15 of the above stamps plus full particulars. Triboro Stamp Company, 145 Nassau Street, Dept. 204, New York 38, N. Y.

POLAR Bear Triangle; Giant George Washington, Six Colored Ecuador, Arctic Triangle, first American commemorative, Corsica, Devils Island, others. Everything free with approvals. Capital Stamps, Little Rock 10, Ark.

FREE Stamp Collection:—100 different stamps from Europe, Africa, Asia, Scandinavia, Balkans, etc. 3c to approval applicants. Tatham Stamp Co., Springfield 50, Massachusetts.

65 ALL Different U.S. Stamps. Includes 50 yr. olds, commemoratives, airmails and $5.00 Stamp. Only 10c. Approvals. Willett Co., Box 511-M, Port Chester, New York.

AMAZING Offer! 200 United States stamps—including commemoratives, airmails, high denominations to $1.00—only 10c to Approval Applicants!! Illustrated Bargain Lists free. Mystic Stamp Co., Dept. 55, Camden, New York.

200 DIFFERENT, including Roosevelt triangle, 10c to approval applicants. S. Avalon Stamp Co., Springfield, Mass.

327 DIFFERENT Stamps 25c! Including early Canada, Newfoundland, British Colonies, Vatican, Red Russia, Hitler Heads, Indian States, Animals, Airmails, French Colonies, Rarities, Unusuals. Every Stamp different. Rare bargain with approvals. Money back guarantee. Niagara Stamp Co., Niagara-on-the-Lake 62, Canada.

ALBUM! Capacity over 1,000 stamps! Only 10c!! Stampmart, Hartford 1, Conn.

12 PACKETS from 12 different countries $1.00. Mammoth Packet List Free. Econopackets, Box 168, Riverside 22, Calif.

225 STAMPS For Only 10c! This mammoth value includes Airmails, Pictorials; stamps from strange Countries cataloguing up to 25c each! Also approvals. Mystic Stamp Company, Camden 55, New York.

FREE 119 Foreign Stamps including Africa, Australia, Pakistan, China, India, Russia and Scandinavia. Send 10c for postage and handling. With approvals. Niagara Stamp Co., Niagara-on-the-Lake 82, Canada.

FREE! Big United States Catalog. Valuable guide and check list. Hundreds of illustrations. Approvals. Harrisco, 227 Transit Building, Boston 17, Mass.

COLOSSAL Stamp Zoo 10c. Jungle Beasts, Wildlife, Domestic animals—Fifteen different, including Rhinoceros, Elephant, Snake, Tiger, Zebu, Kangaroo, Koalabear, Emu, Kookabura, Bull, Horse—Extraordinary accompanying approvals. Niagara Stamp Company, Niagara-on-the-Lake 52, Canada.

WORLDWIDE, 50 all different, absolutely free, just to introduce incomparable approvals. Kent Stamp Company, GPO-Box 67-Lz, Brooklyn, New York.

FREE! Azadhind, Costa Rica, Hungary, San Marino, Monaco, Germany. Request approvals. Inclose 3c postage. Silas, 55-V, Triboro Station, New York 39.

GORGEOUS Flower Triangles, three kinds. Free! Approvals. Olsen, 444 East Hazelwood, Rahway, New Jersey.

FREE! Big United States Catalog. Just published by world's largest stamp firm. Hundreds of illustrations. Lists United States postage stamps complete; big values in United States and foreign packets; amazing "clearance sale" bargains; beginner's kits; special offers; valuable information. Approvals included. Harrisco, 228 Transit Building, Boston 17, Mass.

"WOW! 153 All Different Germany, 10c" Zeppelins, Semi-Postals, Airmails, High Values. Big Bargain lists and approvals included. Jamestown Stamp, Jamestown 509, New York.

"WHAT every collector Should Know" buy your stamps for same prices dealers pay. Also learn secret how dealers operate business from home. Write for copy, "Stamp Dealers' Secrets", bargain price list included. Send 10c to cover handling. Wholesale Stamp Company, Jefferson Valley 8, New York.

FREE Surprise Packet with approvals. Fahsing, Dept. PS, Atascadero, California.

SAVE Money! Buy stamp packets. Worldwide selection. Bargain lists free. Webb, 2200 Quintara, San Francisco 16, Calif.

SPECIAL!! Nudes collection; approvals —10c. Atlas, 2830-P Eisenhower, Racine, Wisconsin.

INDONESIA—10 mint bicolored dazzling pictorials—Just 5c to introduce our famous approvals. Viking, 11-P Northern Blvd., Great Neck, New York.

77 DIFFERENT U.S.—25c. Approvals. Utechts, 1143-A North Keeler, Chicago 51.

SPORTS Triangles—Olympics, Runner, Tennis, plus 51 others, 5c. Approvals. Arthur, 338 Waterloo, Marion, Ohio.

FREE "Stamp Finder". Tells at a glance country to which any stamp belongs. 32 pages profusely illustrated. Garcelon, 36, Calais, Maine.

FREE—Valuable British Empire Collection! 105 all diff. from Aden to Zanzibar! Includes Cayman, Pitcairn and many other exotic colonies. High catalog value! Sent for 10c mailing expenses. Approvals. Kenmore, Milford 9-T, N. H.

GIANT collection! Over 200 different stamps including Timor, Rhodesia, Mauritius, etc. Rushed, only 10c to approval applicants! Eyden, Box 128, Valley Stream 31, New York.

FREE. 250 stamp hinges and 20 different Japan with approvals. Jaydee, 218 West Dickinson, Grand Rapids 7, Michigan.

NEW Zealand triangles, Queen Elizabeth, 10c with approvals. Seminole Stamps, Box 1138-S, Coral Gables 34, Fla.

CHRISTOPHER Columbus mint bicolors. Be first to get this beautiful set honoring the discoverer of America. This plus another navigator set of mint multicolor stamps from St. Thomas and Principe for only 10c to approval applicants—U.S. or foreign. Clark Stamp Co., Dept. B-43, Muskegon Heights, Michigan.

AUSTRALIA, 47 different 10c. Canada 47 different 10c. Leslie Anderson, Seaside Heights, New Jersey.

MIDGET Triangle—Giant Diamond, Rhino, Greenland, 28 others. 3c Approvals. Vidal, 3396 Alta Vista, Cincinnati 11, O.

COLONIAL Collection Free—Magnificarcious collection, British, French, American and other Colonies, Flowers, Animals, Commemoratives, Triangles, Pictorials, High Values all free "plus" Philatopic Magazine. Send 5c for postage. Empire Stamp Company, Dept. PR, Toronto, Canada.

POPULAR SCIENCE OPPORTUNITIES

FIRST U. N. Set. Among World's Prettiest. Only 10c. Approvals. Welles, Box 1246-V, New York City 8.

GORGEOUS Orchid Diamond plus Enormous 5-colored Flag. Will Rogers airmail. First American commemorative. Midget, Corsica and 25 others all 3c to approval buyers. Belmont Stampco, Washington 15, D. C.

SEND 100 Different and 25c coin, for 100 Different. Barnes, Box 226-L, Portsmouth, Virginia.

HUNDRED of packets. Write for list. Casilla 1343, Montevideo, Uruguay.

DEALERS Wholesale catalog. Postage 3c. Franksco, 5031 Queensbury, Baltimore, Maryland.

ANIMALS, Birds, Triangles, Flowers, Butterflies, Fish, Ships, Locomotives, Kings, Dictators, Multicolored, Historical, Geographical, Musical, Battles, Giants, Midgets and over 100 others—only 25c with Approvals. Adults please. Canada Stamp Co., 1907 Main St., Dept. 319, Niagara Falls, New York.

MONACO Nudes 10c! Approvals. Kelly, 51 Holbrook, B-4, Detroit 2, Michigan.

FREE with approvals. Israeli, U.S., Latin America, British, French colonial packet. Hobbies, 1463 Drexel, Miami Beach, Florida.

FREE!! 50 Different stamps enclose 3c postage. Red Seal, Saratoga, Calif.

STAMPS complete issues in sets. Any country. Write, will help you. Sophus Jenssen, Coupeville, Washington.

LOOKING for better U.S. Approvals?? Write New-Way Stamp, Lawrence, Mass.

300 DIFFERENT given free with approvals. Postage 3c. Windsor Stamps, 8834 S. Cornell Ave., Chicago 17.

1500 STAMPS $1.00. Good Variety. World Wide. Many Pictorials. No Approvals follow. Satisfaction Guaranteed. Whalen, 1516 First Ave., Oakland 6, Calif.

25 BRITISH colonies 10c approvals. Stoll, 2634 Burnett, Louisville 10, Ky.

FREE! 3 Mozambique butterfly stamps to new approval applicants. Moumblow, Box 278K, East Northport, New York.

ISRAEL, 25 different for only 25c. Approvals accompany. Dresel, Box 270-K, New York 25, New York.

OLD scarce U. S. seconds on approval. Slightly defective, bargain prices. Hearnfeld, Clintonhill Station, Newark 8, N. J.

U.S. STAMPS, Mint and used copies, fair to very fine. 1954 price list now ready. Contains 96 illustrated pages. Price 20c deductible from first order. Send want list and references for personalized service to E.&A. Maclaurie Co., Room 224, Parkway Building, 117 East Colorado St., Pasadena, Calif.

UNITED States—40 different 10c; 40 different Commemoratives 25c. No approvals. Seidenberg, Appleton 944, Wisconsin.

WONDERFUL Offer Seven complete mint sets only 10c with approvals. Reich (S26), 1033 Lawrence, Chicago 40.

SENSATIONAL U.S. Confederate States catalogue free. Stone, 45-S Bromfield, Boston 8, Mass.

315 DIFFERENT Foreign stamps including animals, flowers and other tropicals. Airmails Coronation and triangle stamps. 25c with approvals. Hathaway, P.O. Box 145-PS, Garden City, New York.

TERRIFIC Collection—Unsurpassed bargain! Animal stamps from Ifni, Iceland fish, Gold mining in British Guiana, Coat of Arms of Nyasaland, Croation imperforates, Spain, Red Cross, Flowers in natural colors from Congo, Columbia, San Marino, Many triangles, Multicolored stamps, Reproduction of first U.S. stamp, Stamps honoring landing of Columbus. These plus a hundred others, only 50c to introduce our bargain approvals. Wolverine Stamp Service, Dept. B-23, Fruitport, Michigan.

SUPERIOR worldwide mission mixture. Amazing variety! Five ounces $1.00. Bay Nielsen, 4407A Catherine West, Montreal 6, Canada.

50 DIFFERENT Juventute stamps $1.00. Ernst Schmid, Hauptpostfach 255, Zurich, Switzerland.

U.S. illustrated price list—Free. Lush, 6422 Ellsworth, Detroit, Michigan.

EXCHANGE Your Duplicate Stamps. Send 100-200 different foreign and 15c. Receive all different. Patterson, 5624 Broadway, Lancaster 12, New York.

UNITED States—58 different including 8 airmails, 15 commemoratives, 10c. Approvals. Sunsets, Box 47, South Gate, Calif.

BEAUTIFUL New Zealand 1943 Elizabeth and Margaret Rose triangles only 10c to approval applicants. George Richie, 1539 Sixth, Alameda, Calif.

UNITED States approvals. Select copies used, mint. Kingsbury, So. Woodbury 2, Vt.

FREE Sample—Interesting, informative. Illustrated! National Stamp News, Anderson, South Carolina.

500 DIFF 25c. New customers. Wilcox-s. Box 292, Bremerton, Washington.

100 DIFFERENT Spain 25c. Penny approvals included. Reed, Box 980, Chicago 90, Illinois.

BARGAINS galore low priced approvals. Chur, Box 245, Buffalo 13, New York.

519 DIFFERENT Worldwide, 25c. Approvals. Wayside, Box 8, Livermore, Calif.

U.S. Prices drastically reduced. Free illustrated bargain catalogue. Rothberg, 44 Bromfield, Boston 8P, Mass.

LET'S Swap!! Rush 100 different and 15c, receive 125 different. Comanche, Box 7817, Lakewood, Colo.

FREE Valuable Mystery Gift. Approvals. Raymax, 37-X Maiden Lane, New York City 8.

100 DIFFERENT 10c with approvals. Jacobsen, 4395—N Broadway, New York 33, N. Y.

250 FOREIGN stamps, 25c to approval applicants. Faith, 1339½ Westminster, Alhambra, Calif.

FREE—53 different United States to approval Applicants. Drop me a card—today. J. Schaenzer, 727 Butternut, St. Paul 2, Minn.

50 DIFFERENT Bulgaria 10c! Approvals. Ensign Stamp Company, Dept. B, Berdan Avenue, Paterson 2, New Jersey.

FREE Congo Flower Set. Approvals. Eagleco, 6916 Roosevelt Boulevard, Philadelphia 49, Penna.

EARLY U.S.! #26 plus 20 nineteenth century! 25c to approval applicants. AAA Stamp Company, Arcade Building, St. Louis 1, Missouri.

RUSSIA Set Free with our personalized low priced approvals. Blanc Stamps, C-25625 Koontz, Roseville, Michigan.

44 PICTORIALS—Triangles, bi-colors etc., only 25c! Approvals. Cole, 43-G Rinewalt, Buffalo 21, New York.

30 COMPLETE sets, $1.00. Approvals. Pinkerton, Box 81-M, Bethlehem, Penna.

LION triangle 28, others 3c. K&S, 303 Clinton Ave., Newark, New Jersey.

UNITED Nations cover free to applicants of U.S. or British Colonial approvals. Alan A. Taylor, Skyland, N. C.

CANADA—100 Different, 25c with approvals. Crown Stamps, Box 331, Toronto, Canada.

ARMENIA, Hongkong, Siam, Mongolia, Ukrania, plenty premiums. Free with approvals. Choice Stampco, Box 424, Miami 3, Florida.

ARMENIA Pictorials. Value 65c. Free with Approvals. Exotic, Box 755, Miami Beach 39, Fla.

50 DIFFERENT U.S. Commemoratives 25c. Durham, 1021 N. Granger St., Saginaw, Mich.

ALBUM and outfit catalog, 5c postage and handling. Dahlquist, Omak, Wash.

GIANT Stamps Free with approvals. Broadway Stamp Co., Altus, Okla.

SUPERIOR Quality stamp grabbags. No approvals. Standard, 1612 New Madrid, Cape Girardeau, Missouri.

25 COLOMBIA, mystery gift — 10c. Smithco, Box 6618, Kansas City 23, Mo.

"MONACO Nudes" 10c with approvals. Royal Stamp Company, Tamaqua 2, Penna.

FREE—Valuable Illustrated Catalog. Over 1100 special offers, attractive Bargains! Approvals. Kenmore, Milford 9C, N.H.

PACKETS world different 200-50c, 300-75c, 500-$1.00, 1,000-$2.00, 3,000-$6.00. Russell, Box S-2011 Natural Bridge Station, St. Louis 15, Missouri.

THOUSANDS of Stamps can be added to your collection at 1 and 2c each. Ask to see our big approval books of attractive, low priced approvals. Everything catalogued according to Scott's. Large discounts. Modern Stamp Co., Dept. B-7, Ferrysburg, Michigan.

SMART? You'll start collecting scarce U.S. commemoratives plate blocks with 6 different for $1.00. Approvals. Wm. Kuehl, 3125 East K, Tacoma 4, Washington.

SELECTED U.S. assortment, 10c. Request approvals. Prospect Hill Stampco, Box 51, Somerville 43, Mass.

KOREAN Set free with approvals. WB Stamps, Box 758, Wilkes-Barre, Penna.

TRIANGLE - Diamond - Midget - Giant - Roosevelt - Hitler - Stalin - 3c! Thrifty Company, Silver Spring, Maryland.

SCARCE colorful Caribbean cover only 10c. List Free. Foreign Cover Service, 4531 N. Ashland, Chicago.

SWEDEN calling. 200 fine Stamps, four Scand. countries, all different. $1.00. F. Eneland, MotalaV, Sweden.

FREE. 10 Saar with 1c. 2c "Albumfiller" approvals. Green, 4301 46th Street, LIC 4, New York.

PITCAIRN Islands—"Mutiny On Bounty" stamps; plus 100 different British Empire; 25c with approvals. Golden West Stamps, Box 245-S, Rivera, California.

FREE. 4 Germany pictorial Sets Approvals. Pleasure Stamps, 1865A—52nd, Brooklyn 4, New York.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The June issue closes on April 23. Write today for order blank and free copy of booklet "How To Make Money Out Of Classified Advertising". O. K. Kelly, Classified Adv. Mgr., Dept. 454, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

29 ANTIQUES, RELICS & INDIAN GOODS

INDIAN Beadwork, leathers, beads, feathers, moccasins, wigs, supplies; buying direct from Indians, prices reasonable. Free list. Pawnee Bill's Indian Trading Post, Box 35-PS, Pawnee, Oklahoma.

4 FINE Indian Arrowheads $1.00. Good Grooved Tomahawk $2.00. List free. Lear's Glenwood, Arkansas.

WOODEN Indians—5½ feet large. $325.00. Peter Meindl, Raymond, N. H.

200,000,000 YEAR old fossils. World's oldest creatures. Three assorted $1.00. Fossils, 4700 Burton, S.E., Albuquerque, New Mexico.

30 MINERALS & PRECIOUS STONES

ATOMIC Trinitite! Send 25c for actual radioactive atomic blast specimen and information on prospecting for tungsten, uranium, mercury with ultra-violet Mineralite. Dept. PS4, Ultra-Violet Products, Inc., South Pasadena, California.

INDUSTRIAL mineral prospecting pays big when you "Hit"! Free instructions. Stratex Instruments, 1861G Hillhurst, Los Angeles 27.

GEMSTONES, Mineral specimens. Every variety. Lowest prices. Free booklet. Plummer's, 4730 Point Loma Avenue, San Diego 7, Calif.

POPULAR SCIENCE OPPORTUNITIES

GEMCUTTING. Silvercraft authority. Illustrated magazine tells how. Cut rocks, make jewelry. 150 ads illustrating equipment, offering gems for collectors, cutters. Postal brings literature. Lapidary Journal, Drawer D, Palm Desert, Calif.

CRETACEOUS Fossils (Exogyra arietina) 2 for 25c. 10 for $1.00. Hawkins, Route 4, Georgetown, Texas.

SAPPHIRE—tourmaline—topaz—garnet—peridot. 5 uncut gem specimens, $1.00. O'Briens, 1116B Wilcox, Hollywood 38, Cal.

DIAMONDS Rough. Guaranteed genuine—origin Africa, Brazil. Send $2.00. House of Diamonds, Box 1119-E, Grand Central Station, New York 17.

FIVE Texas crystal specimens, topaz, quartz, amethyst, garnet, sunstone. $1.00. Simpson's, 2005 N. Big Spring, Midland, Texas.

SIX beautiful gemstones already polished $2.00. Humble, 159 Prichard St., Prichard, Alabama.

BLACK Lights for prospecting or fluorescent display. Glowspar, Box 15721, Los Angeles 8.

GENUINE Gemstones—Ruby, Sapphire, Opal, Jade, Topaz, Aquamarine, Garnet, Moonstone, Tourmaline, Tigereye, Carnelian. All genuine rough gems 1 to 20 carats. Yours for only $1.00 each. 11 pieces for $10.00. Send now for free catalog. International Gem Corporation, Dept. A, 15 Maiden Lane, New York, N. Y.

COLLECTORS! Two dollars bring twelve beautiful genuine specimens from gemland Brazil. Three dollars bring perfectly cut ten carat Brazil-topaze. Airmail bills or check. Jean Bach, 413 Praia Icarai, Niterol, Brazil.

31 HOBBIES, COLLECTIONS

UNUSED matchbook covers—100 different $1.00—36 page catalog 25c—matchcover album $3.00. Charles Edelman, 1311P East 84, Cleveland 3, Ohio.

INVENTING can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors, Dept. 30-E, 631-E St., N. W., Washington 6, D. C.

EXCITING Hobby; collect Authentic Military Patches, Insignias, Campaign Ribbons, Navy Rates, etc. 57 assorted $1.00. Free gift. Pritt, Dept. S-4, 12 West 27th, N. Y. C.

MILITARY Miniatures: U.S. Marines, American Revolution, Civil War, Custer's Cavalry. Illustrated Catalog 25c. Bussler Miniatures, Dept. E, 59 Russell Park, Quincy 69, Mass.

32 PHOTO FINISHING, PHOTOCOPIES, ETC.

35 MM—36 Exp. Develop & Jumbo Print each $1! Guaranteed Quality—Free Mailer. Flash Photo, Box 36P, Parkaville Sta., Brooklyn 4, N. Y.

20 BILLFOLD Size Prints from your favorite negative or picture put on double weight paper for only $1.00. L. A. Eastman Studio, Bode, Iowa.

TWO Prints each good negative, 8 exposures, 35c; 12 exposures, 50c; reprints, 4c. Mayfair Photo Service, Box 617-A, Toledo, 1, Ohio.

ENLARGEMENTS! Eight 5x7's or five 8x10's, $1.00. Wilart Enlargers, Box 967, Little Rock, Arkansas.

OVERSIZE Prints no extra charge. 8-exposure roll, 30c. 12-exposure, 45c. 16-exposure, 55c. Reprints oversize 4c. Finest quality. Mail Order Photo Service, Box 297, Watertown, Wisconsin.

ROLL developed and 4x6 or 3¼x4½ oversize glossy velox prints 8 exposures 40c. 12 exposure 60c. 16 exposure 80c. Hagner Photo Service, 1318 West Columbia Avenue, Philadelphia 22, Pa.

SENSATIONALLY New—16 oversize contact prints or 8 plastic bound superpak album jumbo prints with your first roll 25c. Album Studios, Weatherford, Okla.

FREE Mailers. 8 contacts 30c. Jumbos—40c. 12—45c. Jumbos—55c. reprints—4c. Jumbos 5c. Western Photo PS44, Box 298, San Francisco 1, Calif.

PHOTOSTAMPS! Real, Glossy Photographs in stamp form personalize your greeting cards, stationery. 100 only $2.00, 50—$1.00. Send any photo or negative. Fabian's, Box 63, Ottawa, Canada.

FREE Flash Exposure Guide for color, B&W. Rush postcard with this ad, name and address. Garden City Photo, Box 237-D, Garden City, New York.

33 MOTION PICTURES, SLIDES, SOUND EQUIPMENT

16MM. Movie Subjects. New 300' 16mm. sound releases, $11.95. Bargain prices on hundreds used 16mm. sound, silent prints. Dime brings 32-page, 1954 catalog. Blackhawk Films, 1140 Eastin Bldg., Davenport, Iowa.

GUARANTEED Fresh 8mm roll, magazine; 16 mm roll, magazine movie film. Color, b&w. Free catalog. Eso-H, 47th Holly, Kansas City 2, Missouri.

MOVIE Camera Film: 8 mm roll $1.50. 16mm 100' $3.00. Free processing. Better Films, 742 New Lots, Brooklyn, N. Y.

8-16MM Silent-sound films. Complete rental library. All latest subjects. Free catalogue (sample film 10c). Garden Film, 317 West 50th, New York 19.

FREE Giant catalog of 8mm & 16mm films for home movie enthusiasts. Films for every occasion. Lee Stann, Dept. PS4, 11 Willard Ave., Mt. Vernon, New York.

TAPE Recorders, Tapes, Accessories. Unusual Values. Dressner, 624 East 20th Street, New York City 9.

8MM. Movie Subjects. New 150' films, $2.98. Dime brings 32-page, 1954 catalog. 50' 8mm. Prevue film and catalog, 59c. Blackhawk Films, 1139 Eastin Bldg., Davenport, Iowa.

WILD animal and bird films in beautiful color or B&W. 2"x2" slides and 8mm or 16mm movies. Write for free literature. Wild Life Films, 5151BD, Strohm Ave., North Hollywood, Calif.

CLEARANCE Sale of 16mm. sound films. Want a real buy in 16mm. sound films? Take advantage of the I.C.S. 1954 clearance sale of 16mm. sound features, comedies, cartoons, educational films, religious subjects—New, used. Send for our giant list "A" today stating machine you own (make and model). Institutional Cinema Service, Inc., 1560-PS Broadway, New York 19, N. Y.

8 & 16 MM Professional National Parks Movies in full color. Reasonable. Ideal Service, 4644 Geary, San Francisco 18, California.

5,000 8-16MM. Silent-Sound Films. International, 2120 Strauss, Brooklyn 12.

HUNDREDS of Choice 16MM sound films silent color cartoons—Valuable Gifts. Get free bargain bulletin for complete information. Gaines, Box-114 P.S., Skokie, Ill.

16MM. SOUND Projectors—Excellent used units, all makes, $119.95 up—some $99.95. Dime brings 32-page catalog equipment, films. Blackhawk Films, 1138 Eastin Bldg., Davenport, Iowa.

EARN up to $15.00 daily with your movie projector! Details free. Metcalf, 10806 Glenroy, Chicago.

34 CAMERAS, PHOTO SUPPLIES

ARGUS C-3, case, flash. Spotless. $51.90. Argus C-4, case, never used. $77.00. Free catalogue. 1001 bargains. Dealer's Mart, 54 Beverly Rd., New Rochelle, New York.

PHOTOGRAPHY For Pleasure or profit. Learn at home. Practical basic training. Long established school. Free booklet. American School of Photography, 835 Diversey Parkway, Dept. 1722, Chicago 14, Ill.

FREE With Order — Central's new complete photographic catalog, ready now! Contains complete listings of still and movie cameras and a remarkable selection of photographic accessories, many unduplicated elsewhere. We are known throughout the country as "Photographic Headquarters Since 1899." Send 50c for your copy—you receive full credit on your first order. Central Camera Co., Dept. 11D, 230 S. Wabash Avenue, Chicago 4, Illinois.

BASS Says: Quality Cameras Since 1910. When in Chicago visit the Camera Cross Roads of the World . . . or write us for your favorite equipment, new or used. Satisfaction Guaranteed. Bass Camera Co., Dept. AG, 179 W. Madison Street, Chicago 2, Illinois.

SUNLITE II Pocket-Pak strobe unit, w/batt., perfect for all shutters, original cartons, $71.62. Free bargain catalogue. Dealer's Mart, 54 Beverly Rd., New Rochelle, New York.

DISCOUNTS to 40%—cameras, projectors, tape recorders, lenses. Write for individual quotations, no catalogs. Classified Camera, E. 253 E. 94th Street, Brooklyn, New York.

WHOLESALE . . . Buy the best known cameras, photo supplies at big discounts. Write for details. Public's Wholesale Buyers Guide, 14D Box 247, New Braunfels, Texas.

BUY wholesale nationally advertised cameras, photo supplies, thousands other products at big discount. Free "Wholesale Plan." American Buyers', 629-SS Linden, Buffalo 16, N. Y.

WHOLESALE Photographic Supplies, Cameras, Films, Projectors, Enlargers. Write for Free Catalog. Capitol Photo Supplies, 2428 Guadalupe, Austin, Texas.

PHOTOGRAPHIC equipment, household appliances to 50% off established prices. List 10c. Ardley, 111 Albemarle, Brooklyn 18, New York.

FOTO-Kolor Kit. Colors hundreds of Snapshots. Contains all materials and instructions. Postpaid $1.75. Foto, 2524 McCain, Corpus Christi, Texas.

AMAZING Camera Bargains. Send for our free Photohelper price list. Morgan Camera Shop, 6262-B Sunset Blvd., Hollywood 28, Calif.

35 MUSIC, SONG WRITERS & RECORDS

WANTED! Poems for musical settings. Write Songwriters' Service, Clifton, N. J.

POEMS Wanted for musical setting. Send poems. Free Examination. Five Star Music Masters, 646 Beacon Bldg., Boston, Massachusetts.

SONGWRITERS! Protect your poems and songs! Don't mail anywhere! Write for safe procedure! Song Service, 333 W 56th Dept. P.S., New York 19, N.Y.

SONGPOEMS Wanted. Mail to: Tin Pan Alley, Inc., 1650 Broadway, New York 19, N.Y.

FREE Record of your song—Your words—My melody. Free information. Johnny Mack's Melody Mart, 1094 West 39th Street, Dept. K, Los Angeles 37.

POEMS Wanted for musical setting. Send poems. Free examination. Crown Music Company, 1472-P Broadway, New York City 36.

SONGPOEM Writers—Want Your Songs Published? Get the Inside Facts first. Free Details. Expect Surprise! Melody House, Dept. PS, Box 19007, LaTijera Station, Los Angeles 43, Calif.

SONGWRITERS! Send poems, songs. Music Service, 243 West 72nd St., PS, New York 23.

PLAY Piano by ear in one week thru quickest, easiest system. Free information. Write B. S. Appleton, Leominster, Mass.

SONGWRITERS—Join Amateur Songwriters Club of America. Free details. ASCA, Box 433-B, Hamilton, Texas.

POPULAR Songs. How to write and sell them. Write for free booklet Successful Songwriting. Gateway Songs, Box 2470, Hollywood 28, California.

POEMS Wanted to be set to music. Free examinations. Send poems. McNeil, Master of Music, 510-PS, S. Alexandria, Los Angeles, California.

ELECTRIC Guitars, amplifiers. Wholesale. Free Catalog. Carvin, P.S., Baldwin Park, California.

1954 ACCORDIONS — Wholesale. Free catalog. American Accordion Center, PS-4, 5329 Belmont, Chicago.

78's—45's LP's Every Classification. Listings Free. Paramount, 1801 Ridge, Phila. 21, Penna.

36 RADIO, TELEVISION, SUPPLIES & EQUIPMENT

LIMITED Quantity surplus double headphones. High quality Slightly used. $7.95 Value. Special now $2.95 postpaid. Guaranteed. Allen, Dept. PSH, Clinton, Mo.

BUILD 15 Radios . . . only $19.95 complete. Learn Radio Construction, Theory, Trouble-shooting, Code, F.C.C. Regulations. Complete Radio Course includes all parts, components, Instruction Books, etc. Free Radio Tester and Soldering Iron. No experience required. Money-Back Guarantee. Order direct or send for descriptive literature. Valuable Radio and TV Guide upon request, free of charge, no obligation. Progressive "Edu-Kits" Inc., 497 Union Ave., Dept. 16, Brooklyn 11, New York.

RADIO electronic project plans list 10c. Pfeiffer, 4609 21 Avenue, Astoria 5, New York.

LEARN code fast equipment instruction $5.00. Electronic Communications, Box 567, Springfield, Missouri.

FREE 268 Page 1954 Television-Radio-Electronics catalog! World's largest stocks, lowest prices. Complete supplies for builders, experimenters, amateurs, servicemen. Latest TV, Hi-Fi, radios, phonos, recorders, P.A. equipment. Thousands of parts, tubes, test instruments, books, diagrams. Top quality money-saving values. Get your copy now! Allied Radio Corp., 100 N. Western Ave., Dept. 31-D-4, Chicago 80, Ill.

CRYSTAL Radio experimenters. Write Leslie Hulet, R. 4, Lakewood, New Jersey.

DIAGRAMS for repairing your radio $1.00. Television $2.00. Give make and model. Diagram Service, 672-PS, Hartford, Conn.

BUILDER'S pictorial construction handbook—25c. Alena, Box 24, Astoria 6, N. Y.

HIGH Fidelity 10 Watt Amplifier. Regular $85.00 value for only $34.00. Storm Electronics, 59-47 198th Street, Hollis, N.Y.

NEW super sensitive two inch high Q loop antenna for radios and crystal sets, $2.00. Crystal and diagrams $50. Humble, 159 Prichard St., Prichard, Alabama.

WANT T.V. Radios, Recorders, Hi-Fi, Testers Etc? List of 125 swappers waiting! Send $1.00 to Lists, 2241 E. Broadway, Muskegon, Michigan.

MAKE simple powerful distance-getting crystal radio. Works anywhere. Illustrated booklet fifteen cents. Money back guarantee. Francis, Box 5963, Cleveland, Ohio.

CIRCUIT continuity checker. Complete. $1.00. University Engineering Laboratories, Box 43, Mineola, New York.

STOP those annoying TV commercials with the amazing new Antiblah! Remotely controlled. Easily installed. Moneyback guarantee $2.95. American Enterprises, Box 141, Boston 9, Mass.

F.C.C. Commercial operator license quickly. Grantham, Dept-5, 6064 Hollywood Blvd., Hollywood 28, California.

BUILD your own top quality TV Set. We supply complete equipment, tools, instructions as part of America's finest Home-Study TV Course. Be a high-paid TV Technician. Install, Repair, Service all makes of sets. Many excellent jobs now open. Or start your own business. Get Full Facts Free. Write: Commercial Trades Institute, Dept. CT1-4, 1400 Greenleaf Ave., Chicago 26, Ill.

NEW, high output photoelectric cell generates 5000 micro-amperes! Only $1.00. Springfield Enterprises, Box 54-R, Springfield Gardens 13, New York.

COLOR Television! Enjoy 3 color television screen now. Easily attached. No tools needed. Beautiful color tones. Cuts down glare and snow. Send $1. for size 10" 12" or 14"; $1.25—17" $1.50—20"; $2—21"; $2.50—24" $3—27". Prompt shipment. Satisfaction guaranteed. Dealers Opportunity. Zingo Products, Johnstown 9, New York.

EXPERIMENTERS! Beginners! April issue "Radio Science" 25c. 52 Backman, Westfield, New York.

INCREDIBLE! One tube radio receives television, FM, CAP and amateur broadcasts. Very easy and inexpensive to build. Diagram with special tube only $2.00. Springfield Enterprises, Box 54-R, Springfield Gardens 13, New York.

TRANSISTOR and "Electric Eye" kits. Free bulletin. Electronics, 709 Grove, Buckroe Beach, Virginia.

TELEVISION interference eliminated with effective high-pass filter. Guaranteed $1.00 Postpaid. BMB Co., Box 25, Bethpage, New York.

COMPLETE kit of parts for UHF television converter shown on page 222, February Popular Science. Only $14.95. Springfield Enterprises, Box 54-R, Springfield Gardens 13, New York.

HOME television repair saves service costs. Send television make and model with $1.00. Box 1295, Greenville, S. Car.

CLEARCO Crystal radio kit $1.50; preassembled $1.75. Free catalogue. Clearco Crystal Co., Box 1857, Milwaukee, Wis.

HAVE 3 dimensional sound on your television, complete kit $9.95 Postpaid. Aluminum encased outdoor speakers for yard, barn, or bar-b-que $7.95 Postpaid. T.V. double stacked conical antennas $6.90. D-W Development Corp., 145 N. Erie Street, Toledo, Ohio.

CUT-O-Sound silences irritating commercials, from your viewing chair. Simply attached, only $2.45. Easy to assemble kit with directions $1.50; guaranteed. Brandon Associates, Drawer 1191, Altoona, Penna.

REPAIR your own TV—It's fun, safe, easy! Detailed instructions compiled exclusively for your model. Send set name, model number. $1.00. L.S. Engineering, Box 4113-A, North Hollywood, Calif.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The June issue closes on April 23. Write today for order blank and free copy of booklet "How To Make Money Out Of Classified Advertising" O. K. Kelly, Classified Adv. Mgr., Dept. 454, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

BUILD Crystal Radios. Sensational Melomite Crystal and detector with instructions and plans—50c postpaid. Satisfaction guaranteed. Allen, 427-PS5, Clinton, Missouri.

37 BUSINESS OPPORTUNITIES

GOOD Paying Business Silvering mirrors, plating autoparts, reflectors, bicycles, bathroom fixtures, etc., by late methods. No tanks or shop required. outfit furnished. Free Booklet. Gunmetal Co., Ave. E, Decatur, Illinois.

OPERATE profitable mail order business. Write Walter Service, 4159-B East 112th, Cleveland 5, Ohio.

MAKE money addressing envelopes. Our instructions reveal how. Glen Glenway, 5713 Euclid, Cleveland 3, Ohio.

LIVING miniature ("Ming") trees only 10 to 20 inches tall. Grow at Home. Big Profits! Spare time opportunity. Fascinating! Amazing! Write for Free Seed and Plan. National Nursery, Dept. CG, Inglewood 4, California.

IMPORT-Export! Opportunity, profitable, world-wide, mail-order business from home, without capital; or travel abroad. Established World Trader ships instructions for no-risk examination. Experience unnecessary. Free details. Mellinger, 694, Los Angeles 24.

ENVELOPES addressed accurately, reasonably. Fast Service. We have capable addressers in your city. Glenway System, 5713-X Euclid, Cleveland 3, Ohio.

137 PLANS for starting home business. Details: Elite Co., 220-A Grand St., N. Y. 13.

NEWEST Spare Full-Time Business, $5 to $10 hour possible. Paint with Suede—the finish with touch And eye-appeal. Beautify auto dashboards, signs, radios, toys, figurines, lamps—100, 1 others. Complete Step-By-Step Instructions sent for no-risk examination. Free details. Coast 1004-HN, So. Los Angeles St., Los Angeles 15.

MAKE Money spare or full time, casting Metal Toys and Novelties. Big wholesale and chain store demand for Autos, Soldiers, Ashtrays, Banks, etc., keeps manufacturers busy. Production moulds furnished for up to 100 and more castings per hour. No experience or special place necessary. Write for information and illustrations of patterns needed. Metal Cast Products Co., Dept. E, 1696 Boston Road, New York 60, N. Y.

VENDING Machines—No selling. Operate a route of coin machines and earn amazing profits. 32-page Catalog Free! Parkway Machine Corporation, Dept. T3, 715 Ensor St., Baltimore 2, Maryland.

TROPICAL Fish supplies. Save! Representative your area will supply. Nmoae, Box 4635, Los Angeles 24, California.

RECAST old batteries into new. Latest achievements. Battery Laboratories, Minneapolis.

BREED Rare Tropical Fish at home. Earn Big Money! Learn Secrets! Help fill huge demand. Amazing Opportunity! Free Plan. Tropicals, 1008-G Los Angeles St., Los Angeles 15.

FIX typewriters. Free booklet describes our modern, inexpensive home-study course. Factory methods taught. Write Typewriter, Building 4, Tarentum, Penna.

$25 WEEKLY working two hours daily at home. Lycke, Box 2471-B, Cleveland 12, Ohio.

BRONZED baby shoe metallizing equipment. New and used. Big selection of metal and onyx mountings. Free catalogue. Hollywood Bronze Supply, 1624-A E. First Street, Los Angeles 33, California.

WE Love our mailman—He leaves over $1,000.00 monthly in our rural mailbox. My college professor husband drafted a scientific home mailorder method. We bought a Texas ranch, live as we always wanted. Now we sell the "Ranch Mailorder Method." Operates anywhere. Inquire: Evemingshade Ranch, Helotes, Texas.

"INCOME" from local information. No Selling. Write Neherco, LaVerne 6, Calif.

$500,000 BY mail from home. Free Folder. Publicity, Kalamazoo 65EQ, Mich.

MAKE Money At Home as renewal headquarters for all magazines. Liberal commissions. No experience—No capital needed. Supplies furnished. Write for Free Catalog. McGregor Magazine Agency, Dept. 510B, Mount Morris, Illinois.

BIG Money—Amazing new home business—Pearl finish baby shoes. Free plan. Pearl Art, 7216 Bear, Bell 2, California.

MAN Wanted—Are you dissatisfied with your work? Would you like a business of your own? If so, write Rawleigh's, Dept. D-GG-PSC, Freeport, Illinois.

SEWING Machine — Repair—Sales — Servicemen needed. "Previous experience unnecessary". Operate home setup. Spare full time. New zigzag machines, motors, parts, etc., supplies. Write today. Taylor Service Co., Hamilton PS-4, Ohio.

AMIDON fittings add to incomes. Amidon Engineering Co., Elyria, Ohio.

OPERATE profitable mailorder "Letter Shop". Write Continental Publishers, 1332-A So. 61st, Milwaukee 14, Wisconsin.

THRILLING Profitable Home Business. Make fast-seller chenille monkey trees, dolls, flowers. Terrific holiday demand. Information free. Velva, Bohemia 17, N. Y.

POPULAR SCIENCE OPPORTUNITIES

MOLD Making Liquid Rubber; quarter pint sample with instructions. $1.00 postpaid. Plastercraft Supply Company, 3051 St. Clair Ave., Cleveland 14, Ohio.

ADVERTISING book matches—Cash in on big demand—sell Union Label matches. Cuts for all businesses and political parties—Free powerhouse selling kit—low prices—protection guaranteed on repeat orders—Cash commissions. Superior Match Co., Dept. PX-454, 7530 Greenwood, Chicago.

LEARN metalizing baby shoes, gifts, etc. Bronze, gold, silver. Folio Free. Kiktavi, 7217-PS South Broadway, Los Angeles 3.

LEARN About Florida's Opportunities for You. Businessmen—Industrialists: Florida abounds with opportunities of many kinds for large and small businesses and industries. Highly favorable tax climate. Free, complete information available. Write, stating specific requirements, and you'll be put in touch with communities offering what you need. Write today as the first step toward locating in wonderful Florida. Address: State of Florida, 4315F Caldwell Building, Tallahassee, Florida.

WOMEN! Make Big Money at home. Sew ties for us. It's fun. Earn $10 day easy. No selling, no experience, no machine necessary. We supply everything. Help us fill huge demand. Exciting details free." Fashion Ties, 2531-X, Manchester, Inglewood 4, California.

MINK Raising information free. Complete. Lake Superior Mink Farm, Superior E E5, Wisconsin.

EARN Money With Typewriter—Sewing Machine. Details Free. Edwards, 3915-PS, 12th, Des Moines 13, Iowa.

FREE! "301 Profitable Small Businesses!" Amazing shoestring plans! Work Home! Start Sparetime! Deumant Surveys, Kenmore 23-T, New York.

BOOKKEEPERS, increase earnings operating sensational bookkeeping service. Kern, 4942-B Vineland, No. Hollywood, Calif.

ADDRESS advertising postcards. Must have good handwriting. Lindo 504, Watertown, Mass.

BE Notary Public. Rate higher. Details Free. Stationers, Helotes, Texas.

NATIONALLY advertised appliances, cookware, diamonds, watches, typewriters, etc. Wholesale catalog 50c.—J. J. Davis Co., 30 E. Englewood Avenue, Englewood, New Jersey.

START Your Own Business. No investment required. Buy name brand items wholesale. Big profits! Send for free details. Public's Wholesale Buyer's Guide, 14B P.O. Box 247, New Braunfels, Texas.

WHAT'S Your Field Of Interest? Whatever it is, specialized magazines will help you get ahead. Examine current copies of those covering your field through our Easy-to-Get-Acquainted service. Choose from 4,387 covering all fields—business, trades, agricultural, professions, insurance, real estate, music, educational, hobbies, sports, etc. Current List Free. Commercial Engraving Publishing Company, 348 North Ritter, Indianapolis 19, Indiana.

BECOME A Game Warden, or join Forestry, Park, Lookout, Wildlife Conservation services. Enjoy outdoor work, good pay, real security. Complete information Free! Write "Home-Study Institute", 3156NA West Eighth, Los Angeles 5, Calif.

"MAKE Perfume, other products—Sell mailorder—Formula Catalogue Free. "International", 6347 Parnell-PS-4, Chicago 21, Illinois.

HOW and where to obtain Capital? Free details. Star Service, Wapakoneta, Ohio.

EARN extra money weekly mailing circulars for advertisers. Complete instructions —25c. Siwasliam, 4317-B Gleane, Elmhurst 73, New York.

TO $40.00 weekly. Sparetime, home operated mailorder business. Successful "Beginner's" plan. Everything supplied. Lynn, 10420-C National, Los Angeles 34, Calif.

BUY Wholesale thousands items. Lists Free. Cottage Industries, Omaha 12, Neb.

MONEY in new greaseless doughnuts. Start in kitchen. No smoke. Sell stores. Free recipes. S. Ray Co., 3605 South 15 Ave., Minneapolis 7, Minn.

OPERATE "Escalator" Mailorder system, selling our products or any products. Fastest, most revolutionary mailorder system known. Write: Selbyco, Decatur 167, Ill.

LIQUID Rubber make flexible molds. Free Sample. Chaney, 1130 E. 16th St., Jacksonville 6, Fla.

REPAIR dolls; learn reweaving; make rubber stamps. Catalog of "60 Ideas" Free. Universal, Box 1076-B, Peoria, Ill.

$46 FROM Square Foot Plywood; Jigsaw necessary. Write: Woodart, Bridgewater, Mass.

HOUSEWIVES, earn money at home. Spare, full time. I do. Details 25c. Evelyn Ennis, South Road, East Greenwich, R. I.

EARN money! Amazing plans! Easily mastered Details. Bruns, 216-E West Jackson, Chicago 6, Illinois.

WHERE to get new, unique, "Hard To Get" $1-$10 items for mailorder. Complete lists with names, addresses of their manufacturers only $1.00. New lists compiled monthly. Coral Products Co., 550-B Fifth Avenue, New York 36, New York.

$200 WEEKLY Reported! No selling. Free booklet. T. J. Surface, Roanoke 4, Va.

MAKE Perfumes Other Products. Home. "Carelabs", 1914-PS4, Choutesu, St. Louis 3, Missouri.

MAKE Durable plastic of waste. Makes attractive floors, plaster, built-ins, stucco. Build good home $150.00 room. Bays Laboratory, Oklahoma City 9.

EXPORT Business easy made! Substantial income from home. No merchandise buying. Full setup service, includes everything. Hermes Exports, 152R West 42, New York 18.

POPCORN and Potato Chip Equipment. LECo, Box 933-B, Springfield, Ohio.

MAKE flexible molds. Cast plaques, figurines. Free sample. Tooker, 630-A Chestnut, Hamilton, Ohio.

BUY Wholesale—sell retail Brand Name appliances, watches, etc., Full details—Catalogue 50c. International Sales Co., 175-B Fifth Avenue, New York 10, N. Y.

START A Buying Service, buy wholesale thousands nationally advertised products. Make big profits selling at sizeable discounts. Postcard brings details. American Buyers', 627-S Linden, Buffalo, N. Y.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 178, 2954 Admiral Way, Seattle, Washington.

$250 WEEK reported! Free book "505 Odd Successful Businesses." Work home! Expect something Odd! Pacific-36C, Oceanside, California.

NEW Exceptionally profitable plans, ideas for home operated mail business. Rush name. Miller, 1772-R Carlyon Road, East Cleveland 12, Ohio.

ELECTROPLATE autoparts, novelties, mirrors, baby shoes. Easy, inexpensive home process. Free booklet. Tyco Metals, Box 12231-CQ, Houston 19, Texas.

PLASTERCRAFT molds, liquid rubber, plasters, flocks, candle supplies. Catalog and manual free. Jayhawk Plasters, Blue Rapids, Kansas.

BUILD luggage and cases at home. We sell your products. No special equipment needed. Free details. Casecraft, 805-X7 Sunset Blvd., Los Angeles 12.

CALIFORNIA Here You Come? But first, let me personally investigate and answer those important questions for you before you sever your present connections. Any subject, $5.00 per subject. Money refunded if unable to answer questions. I am a successful California Corporation President. Address: X.M. President, 11156 Weddington, North Hollywood, Calif.

SPARE time cash to fortune in lighting industry. Nunley Enterprises, 3390A Wiley, San Leandro, Calif.

MEN Introduce Regulators. New secret electromechanical formula. Dial adjustable to battery age. Keeps battery charged. Protects generator. Big profits. Few spare hours daily. Hundreds of dollars monthly. Demonstrators free. Write Scientific Electric Co., Box 2162BA, Cleveland 8, Ohio.

GUATEMALAN typical handmade products: Excellent Gift Shop items. (leather bags, belts, skirts, Indian dolls, baskets, etc.) Mail orders filled. Dealers inquiries invited. Write Airmail for free catalog. Maplion, Box 268, Guatemala, C. A.

200% PROFIT. New item. Stamp brings details. Weigand, Graham, Florida.

IMPORT! Export! Homework. Free details. Warners, Box 6, Ft. Scott, Kansas.

GET $10 orders by Mail! 100% Profit! Everything furnished: Terrill, Bogard 11, Missouri.

EXCITING New Kind Mail Order—Start on shoestring. Terrific Profits. Eastern, Box 142-M, Boston 24, Mass.

MEXICO! Imports! Curios Wholesale! Giftshop, collector's items! Sample and pricelist 50c! Filmer, 910 Marion, Pharr 10, Texas.

RAISED Printing sales kit Free! Offering quality service. Profits. Lidfin, 3813-J Winslow, Fort Worth 9, Texas.

WANTED! Home Producers, by manufacturers in our Clearing House Service. Become subcontractor, casting plastic products for these companies. Thousands of easy-to-make items required for consumer-industrial use. Cash in at home, without previous experience. Plastic Service Associates, Dept. 4-PS, East Boston 28, Mass.

HAVE Home Mail Business—Get $10 Orders In Every Mail—Keep $8.00. Everything Furnished. Hutchinson, 401C Adams, Dorchester 22, Mass.

MAKE Money Addressing Envelopes. Our instructions state how. Merit Company, PS-983—E. Main, Columbus 5, Ohio.

SAWDUST. Turn it into cash. Twenty methods. Instructions 50c. Charles Company, 12-EBY, Norwood, Ohio.

EARN $2.00 Hour! I do—making Sandals. Youngs, 1308-PS South First, Arcadia, California.

$26,500 SALES in two weeks! Amazing radio-mail order method. Free details. Broadcast Service, 1412-L Great Northern Building, Chicago 4, Ill.

$$$$ IN personalized baby record books. Sell by mail. Eleven thousand new prospects daily. Use same literature we do. No-Co-Ro, Oakland 6-P, California.

UNUSUAL homework opportunity. Spinning angora for us. Men, women, sparetime. Angora House, PSM, Springfield, Ill.

FRANCHISES Make Profits! Become exclusive distributor, agency operator your territory. Nationwide opportunities. Request information immediately. National Franchise Reports, R-810, 920 North Michigan Avenue, Chicago 11, Illinois.

MAILORDER Home business using Free Advertising Method. Information free. H. G. Seidel, 7070 Hollywood Blvd., Hollywood 28, California.

WANTED—Ideas, products, Inventions for mail order Business—cash or royalty basis—Brayton Enterprises, Box 41204, Los Angeles.

$4,000.00 PROFIT in two months. No investment. Details 50c. Charles Company, 12-EBZ, Norwood, Ohio.

COLORGLAZED Concrete pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, "Minnesota."

MAKE Money at home doing easy pleasant work. Everything furnished. Good earnings. Write Murray's, Box 4006, Mott Park Station, Flint 4, Michigan.

POPULAR SCIENCE OPPORTUNITIES

EARN $15,000-$30,000 Annually. Franchise protected. Guaranteed minimum $12,500 or money back. Live at home. No merchandise to buy. Self-employed. One of the most exclusive and noncompetitive businesses in United States and Canada. Send for free explanatory booklet. Harrell & Company, Box A-2, Louisville, Illinois.

START Venetian Blind Laundry. Profitable lifetime business. New machine. Free booklet. P.D. Co., 442 N. Seneca, Wichita 12, Kansas.

EXCITING Colorful Liquid Marble information. Free Catalog. Write: Bing Products, PS-454, Watertown 72, Mass.

OPERATE Profitable Mailorder Business. Bryant, 5237 N.E. 22nd, Portland, Ore.

RAISE crazy waltzing mice. Write for particulars. S. E. Keegan, 7855 Mill Road, Philadelphia 17, Pa.

YOUR own Vitamin "Private Label" Business. Free Imprinting, earn $25,000 yearly! Mark Laboratories, Inc., 80 Fifth Avenue, New York 11.

EARN money making rhinestone jewelry. Rhinestones 50c gross. Catalog. Ebert, Box B183, East Orange, New Jersey.

BUY it wholesale. Manufacturers, Distributors. Over 850,000 items. Literature free. Olsen, 1231-B East Third St., Duluth 5, Minnesota.

MAKE $100.00 Weekly Mailing Merchandise Catalogs. Bearing your name. Sample catalog details 25c. Products, 526 Western S., Chicago 12, Illinois.

$1000 A Week Possible With Great Triple Profit Plan. Edikara, Johnstown, Penna.

START your own profitable home mail-order business! We supply everything! Write today! Studio Products, Box 564-"D," Glendale 5, California.

PARAKEETS—$400 month profit from 6 pairs. Spare time. Small space. Breeding information free. Zale, 1024B Bellwood, Bellwood, Illinois.

HAVE New York address with mail service $3 month. 516 Fifth Avenue, Suite 1004, New York.

PRINT without a Printing Press! Amazing New Method! Print colorful signs, banners, cards, posters, glassware—anything at home. Big profits $ $ $ $ $ Opportunity! We supply verything. Beautiful Sample. Home-Business Plan Free! Write Screen-Print Company, Los Angeles 15, Calif.

AMERICA is still the land of golden opportunities. Fortunes are still begging to be made. Learn how to establish and operate the business of your own choice. Complete business kits only $5.00. Details free. Golden Opportunity Business Kits, 2096 Stanley Ter., Union, New Jersey.

NATURAL molding rubber, extra thick. Free sample. Flock, tinsel candle wax. W. Wooley, 115-B Donald, Peoria, Illinois.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The June issue closes on April 23. Write today for order blank and free copy of booklet "How To Make Money Out Of Classified Advertising". O. K. Kelly, Classified Adv. Mgr., Dept. 454, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

38 MONEYMAKING OPPORTUNITIES

SELL Titania gems; $9.75 carat wholesale. More brilliant than Diamonds. Free catalogue. Diamonite 1404-S Mitchell, Oakland 1, Calif.

DETECTIVES Earn Big Money. Experience unnecessary. Detective Particulars free. Wagoner, P-125 West 86th, N. Y. 24.

MAKE Money addressing Envelopes! Our information reveals how. Only 30c. Business, Dept. 45-D, P. O. Box 2224, St. Louis, Missouri.

SPARETIME Profits Taking Subscriptions. All Magazines. Wholesale Catalog Free. Cassell Agency, Westfield 1, N. J.

$500,000 BY mail from home. Free Folder. Publicity, Kalamazoo 65EN, Mich.

NEED More Money To Live On? Increase your weekly income $20 to $25 or more in spare time. Supply Rawleigh Products to Consumers. Also openings for full time Dealers. Write Rawleigh's, Dept. D-DD-PSC, Freeport, Illinois.

1930 DEPRESSION forced me to invent my own business—a minimum-cost, high-potential home mailorder. Lucky design paid immediately, over $1,000 every month since! Over half net! This original design, "Selective Mailorder," is United States Postal Service approved. Now mapped out to guide mailorder operators. Literature free. Eveningshade Ranch, Helotes 15, Texas.

NATIONAL mail order house offers sensational mailing program full or part time. Suppliers Mailing, Buena Park 9, Calif.

$35 WEEKLY addressing envelopes. Instructions $1, refundable. Adservice, Spring Valley 36, New York.

FREE! "301 Profitable Small Businesses!" Amazing shoestring plans! Work Home! Start Sparetime! Deumant Surveys, Kenmore 23-T, New York.

NEWEST Spare, Full-Time Business. $5 to $10 hour possible. Paint with Suede—the finish with touch And eye-appeal. Beautify auto dashboards, signs, radios, toys, figurines, lamps—100, 1 others. Complete, Step-By-Step Instructions sent for no-risk examination. Free details. Coast, 1004-SP, So. Los Angeles St., Los Angeles 15.

MONEY Found. Be our agent in your community. Top quality watches, diamonds, jewelry, etc., at wholesale prices. Amazing profits. Life-time income. Experience unnecessary. No age limit. Send for free catalog. Zerah Bros., 602 Mission Street, Dept. 341, San Francisco 5, Calif.

NEW Plastic Mending Tape. Just press on! Repairs clothing instantly. Lightning seller. Samples sent on trial. Kristee 102, Akron, Ohio.

ADDRESS advertising postcards. Must have good handwriting. Lindo 504, Watertown, Mass.

OPERATE profitable mail order business write for detail. N. J. Bode, 223 So. Jefferson, Canonsburg, Penna.

"WEALTH For You—A Guide to Riches" booklet gives novel ideas on how to earn more money. Send $1.25 to Fishers Projects, Fishers, New York.

BE "Mailorder Millionaire", complete instructions. Price list imports $1.00. Waco, Box 834, Spokane, Washington.

NEW 7"x11" Ultra-Blue Signs. 7c, retail 50c. Sample free! Lowy, 812 Broadway, Dept. 783, New York 3.

BUY Wholesale! Thousands Nationally advertised items. Save—Make money! Free Details. Durex Company, Box 672-S, Chicago 90.

OWN, Operate, Route—"Wishing Wells." Place these New $8.50 Skill Games on counters in Cafes, Clubs, Luncheonettes, etc.—collect coins weekly. Write. "Legalshero", Box 929, Long Beach 1, California.

MINIATURE Trees. Why pay $2.00—$10.00 for growing secrets? Free Details. Tiny Trees, 5038 N. Winthrop, Chicago 40.

EARN $100 a week easy to learn Cartooning Self Taught. Details free. Complete Course $2.50. RTK, 1402 East 49th, Cleveland 1, Ohio.

SAVE Money! Make money! Buy nationally advertised merchandise at low wholesale prices. Write for free plan. Public's Wholesale Buyers Guide. 14C Box 247, New Braunfels, Texas.

HOMEWORK! Immediate Commissions! Permanent! Experience Unnecessary! Hirsch, 1301-B Hoe, New York City 59.

MAKE to $4.50 hour doing common pen lettering. National Artists, 801½-C North Marsalis, Dallas 3, Texas.

Wanted: Typewriter owners. Make handsome profits. Write today. Groves Company, 682 Hastings 3, Nebraska.

EARN Money Evenings, copying and duplicating comic cartoons for advertisers. Adservice, Argyle 2, Wisconsin.

MANUFACTURE Rhinestone and Pearl Jewelry at home. Latest creations, tremendous profits, no skill needed. Postcard brings illustrated catalog of settings, stones, etc. A. V. Cutt Co., Inc., 210-H Fifth Ave., New York 10, New York.

YOU can buy wholesale! Save up to 70% on Nationally advertised jewelry, appliances, watches, etc. Free information. Dorinda Enterprises, Box 77, Huntington Station, New York.

MAKE big money, buying wholesale—thousands name brands. No investment. Anderson, P.O. Box 3552, Corpus Christi, Texas.

MAKE beautiful wall plaques from household materials; unbelievable profits. Instructions 25c. P. O. Box 882, Augusta, Georgia.

LET us exhibit and "test sell" your original handcrafts. See ad under "Inventions Wanted". Xibit-Mart, Inc.

ARE you worrying how to save money. Here is the way, just by buying directly from me. I can save you 10% to 20% discount on every dollar you spend, from jewelry to home tools, in fact 7000 items to choose from, and the best brand of merchandise. Satisfaction guaranteed or your money refunded. Write or call for more information. Ferguson Sale, Passumpsic, Vermont.

SAVE Money! Make Money! Buy thousands of nationally known products at wholesale. Buy for yourself. Sell others at profit. Get our "Individual Wholesale Guide." Free. Fitzpatrick, 1842 Jeanette, Abilene, Texas.

START A Buying Service, buy wholesale thousands nationally advertised products. Make big profits selling at sizeable discounts. Postcard brings details. American Buyers', 630-S Linden, Buffalo, N. Y.

SPARE Time Money plus New Car as encouragement bonus. Amazing 60 gauge nylons 3 pairs guaranteed 3 months. Write Wilknit, 2044 Wash., Greenfield, Ohio.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 179, 2954 Admiral Way, Seattle, Washington.

FREE Book "505 Odd Successful Businesses." Work Home! Expect something Odd! Pacific-35C, Oceanside, Calif.

UNLIMITED Earnings! Operating Home Mailorder Business. Jackson, Newfoundland 3, Kentucky.

BUY wholesale! Nationally advertised products. Tremendous discounts. Particulars free. Econ-O-Mart, Box 535A, Morristown, New Jersey.

GOOD pay clipping newspapers. Make up to fifty cents per item. We buy. Complete information, 25c. Box 4622, Pittsburgh 6, Pa.

TYPISTS! Make money at home! For details write R&M Service, 2 Madison, Greencastle, Indiana.

MONEY for you! Write today! Model Products Co., Dept. A-1, Box 118, Wenatchee, Washington.

SELL Merchandise By Mail—Everything Furnished. Orders filled. Big profits. National, Box 98-S, Dorchester 22, Mass.

HOME Business Opportunity—Mailing Literature. All Profit—Orders filled Free. Everything furnished. Genmerco, Box 142-R, Dorchester 24, Mass.

MAKE money at home. Write. Falcon House, Winnebago 4, Illinois.

CAN You Earn $40 Weekly Addressing Display Postcards? Enclose stamped addressed envelope; write Allen Co., Warsaw, Indiana.

POPULAR SCIENCE OPPORTUNITIES

MAKE Big profits operating mailorder business. Lewis Bartlett, Richland, Ga.

WIN contest money. General Contest Bulletin gives hundreds of tips. Lists current contests and rules. Sample 25c. General Contests, 1609-A East 5th, Duluth, Minnesota.

EXTRA Income! Addressing-Mailing advertising literature. Everything furnished! Rush 3c stamp for information. Advertisers, Box 4097-N, San Diego 4, California.

FUTURE Security! Learn Watch-Clock Repairing at home. Inquire. Modern Technical Supply, 55-PS West 42nd Street, New York 36.

MAILORDER'S Greatest Magazine. Sample 5c. Sell 7 merchandise items with postcards 5c. 200 Buyers names 10c. 1000-25c. On Gummed Labels 85c. Barr, Box 8618A, Milwaukee, Wisc.

ALUMINUM awnings, baked enamel colors factory prices sell your neighbors. Write Allweather Comfort, Box 10254, Tampa, Florida.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The June issue closes on April 23. Write today for order blank and free copy of booklet "How To Make Money Out Of Classified Advertising". O. K. Kelly, Classified Adv. Mgr., Dept. 454, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

39 FORMULAS, PLANS, ETC.

FORMULAS—All kinds. Latest products. Literature free. Kemico, Park Ridge 15, Ill.

500 MONEY Making Formulas, 25c Postpaid. Allen, Dept. PSC, Clinton, Missouri.

REAL Manufacturing Formulas. Lists Free. Cumming, Chemist, Gordon Avenue, Syracuse 4, New York.

NEW leather plastic putty for soleing shoes, simple formula $1.00. Lafayette Sales, 241 Suydam Avenue, Jersey City 4, New Jersey.

FORTUNES in Formulas, 10,000 money making trade secrets, 900 page $15.00 volume. $3.95 postpaid. Brockway Plan, 1145 High, Topeka 2, Kansas.

ANY Formula $5.00. Satisfaction guaranteed. Jack, Chemist, 5138 Gainor, Philadelphia 31.

FREE Formula Catalog. Anything analyzed $35.00. Western Chemical, Salem, Ore.

BE your own chemical manufacturer. Tested Household, cosmetic formulas. List Free. Write Sacco, Box 711, Binghamton, New York.

MILLER'S modern manufacturing formulas make fast selling products that get the business and pay! Fifty years supplying the best. Late literature free! Lipscomb Miller, chemist, Tampa, Florida.

ANY Formula $3.00. Catalog—Chemical Instruction sheet 10c. J. Belfort, 192 N. Clark, Rm. 620, Chicago 1.

LABORATORY Tested Formulas. Catalog free. Pont Chemical Company, Terre Haute 1, Indiana.

40 PLASTICS

PLASTICS home-craft course for Men and Women. Tells and shows how to make hundreds of fast selling plastics products. All plastics and materials for 23 projects included in course. No special tools needed. Course pays for itself. Write for Free booklet. Interstate Training Service, Dept. D2-D, Portland 13, Oregon.

PLEXIGLAS Lucite. Any size sheets. Square foot (12x12) cost, 1/16" $1.18; ⅛", $1.55; 3/16", $1.90; ¼", $2.25. Add 15% for postage. Minimum order $3.00. Almac Plastics, 600 Broadway, New York City.

PLEXIGLAS sheets—cut to size—clear, all thicknesses—standard outdoor translucent colors. McClarin Plastics, P.O. Box 168B, Hanover, Pa.

LEARN Plastics at home. Complete kit—$5.98 postpaid. Dime brings sample plastic, three experiments, full details. Plastic Projects, Box 5151, Detroit 35, Mich.

NEW liquid casting plastic. Clear, colors. Preserve flowers, insects, photos permanently. Saw, drill, carve. Send 25c for Castolite Casting Manual and proved Success Plan showing how to make money at home. Castolite, Dept. D-102, Woodstock, Illinois.

PLASTIC Sheets, Rods, Tubes; etc. Free List. Plastic Supply Co., 2901 N. Grand Blvd., St. Louis 7, Mo.

FIBERGLAS, Polyester, Plexiglas, Acetate, Vinylite; Casting, coating plastics: Maurice Lannon's Fiberglass "How" book now ready—$2.50. Fast service, best prices. Catalog 10c. Airmailed—35c. Gem-O'-Lite, Box 6868P, North Hollywood, Calif.

GET prices, information, greatest improvement over modeling clay, Pyrocon, about Kelon, new water clear casting plastic. Science Now Company, RD 2, Box 107A, Catskill, New York.

41 CHEMICALS & APPARATUS

NEW Idea Chemical and Apparatus Outfits for Home Experimenting Photo-Scales, Microscopes, Chemicals, Biological and Laboratory Supplies in Small Quantities. Catalog 25c. Established 1931. John H. Winn, 124-B West 23rd Street, New York, N. Y.

ILLUSTRATED Catalog: Chemistry, mineralogy, biology 20c. Tracey Laboratories, Evanston, Illinois.

DO your own analyses and chemical separations. Laboratory analytical ion exchange column. Apparatus complete with cation, anion resins, instructions. $4.00. Rainaway Chemical Company, 800-B Delaware, Berkeley 9, California.

CHEMICALS and apparatus for industrial, analytical and private laboratories. Catalog 25c. Dept. M-26, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N.Y.

42 HELP WANTED

FOREIGN & Latin American Employment 1954 "Foreign Service Directory" gives Up-To-Minute Facts on Military & Civilian Construction, Government Jobs, Major Oil Listings, Aviation, Transportation, Steamship Lines, Mining, Importers, Exporters. How-When-Where to apply application forms. Hot List Firms Hiring. $1.00 postpaid. Global Reports, Box 883-S, Hollywood 28, Calif.

MEN Wanted now in South America, Alaska, Africa, Australia. $400 to $1200 monthly. Travel paid. Complete information and application forms $1.00 postpaid. Airmail $1.25. Kemah Company, 3618-B Washington, Houston, Texas.

ALASKA!! Last American Frontier. $1.00 brings 1954 Business Directory & Government Map, Military & Civilian Construction; Homestead & Highway facts; Mining, Aviation, Fur Farming, Grazing, Timber, Travel directions, List of firms hiring, How to apply. Alaska Opportunist, Box 92-S, Hollywood 28, Calif.

JOBS on ships and yachts, excellent pay. Foreign Travel. Davenport's, Dept. 4, Box 1354, GPO, New York 1, N. Y.

JOBS Overseas! Some paying skilled $340 weekly, drivers $275, laborers $255. Transportation, overtime. 33 firms seeking applications from construction men, clerks, etc. Plus 269 projects underway in 52 countries. 44 page, printed, plastic-bound manual, forms, everything, $1. Jobservice D-1, Box 30, Billings, Montana.

FOREIGN Jobs, $2.00 tells how, where apply. 60 countries. Choose Country and Profession, Oil, Construction, Steel, Job Information, 902, South San Francisco, California.

FOREIGN & Domestic Jobs. High Pay to $14,000. Fare paid. Alaska, So. Am., U.S., etc. Stamped self-Addressed env. brings reply. Foreign Opportunities, Waseca 2A, Minn.

FOREIGN Employment Construction Work. If interested in foreign projects with high pay, write Foreign Service Bureau, (Dept. P.S.), Metuchen, New Jersey.

ADDRESS advertising postcards. Must have good handwriting. Lindo 504, Watertown, Mass.

CONSTRUCTION Jobs in U.S. To $4.12 hourly for skilled. Carpenters, $3.55. Electricians, $3.60. Laborers, $2.40. We list jobs (U.S., Canada) now underway wages on each, length of job, where to apply, etc. $2. Airmail, $2.35. White Pass Reports C-1, Box 716, Cody, Wyoming.

CALIFORNIA jobs. California's population increasing over 400,000 yearly—become one of them—Have a job waiting your arrival. Complete listings, information, $1.00. Satisfaction Guaranteed. Midcentury, Box 11461, Los Angeles 48, California.

FLORIDA — opportunities unlimited — Send for your "1954 Guide to Florida" only $1.00. Write Florida Jaycees, Box 325, Melbourne, Florida.

"INTERNATIONAL Employment Reports!" Who to contact—how to apply for high paying jobs in 38 countries, including U.S., Spain, Alaska, South & Central America, Europe, etc. Listings of employers with contracts (names, addresses, projects, Complete information) who hire skilled, unskilled, professional, supervisory, clerical, laborers, trades, many others. Also best oil, aviation, manufacturing opportunities. Only $2 (Airmail $2.25). Includes one year registration and advisory service. We can help you find employment. Only service with unconditional guarantee of satisfaction or money-back. International Reporter, Box 1047-SB, St. Louis 1, Missouri.

OVERSEAS Jobs. Big pay, transportation, expenses. Clerical, professional, mechanical workers. Most all trades. Latest listings aviation industry, construction, manufacturing, oil companies, government agencies, many other opportunities. Up to date information on securing employment, contracts, income tax, application forms. $1.00. Overseas Jobs, Box 67-J-1, Vincennes, Indiana.

GERMAN address lists, anything manufactured, good list $1.00. Burke Associates, Manchester 2, Mass.

DETROIT or Grand Rapids Help Wanted columns airmailed $1.00. Elster, 213 Pleasant S.E., Grand Rapids, Michigan.

HONOLULU Help Wanted columns airmailed $1.00. Pomeroy's, 33 Campbell Block, Honolulu, Hawaii.

FOREIGN Jobs. Contracts underway and soon starting in Africa, South America, Canada, England, Europe, South Pacific, Middle East, Mexico and Alaska. Send $1.00 for foreign job news, information, application forms, etc. DCS Foreign Job News, Dept. 268-XW, Bridgeport, Ill.

CONSTRUCTION Job List Published Monthly. $1.00. Dempster's Construction Scout News, Dept. 268-XV, Bridgeport, Ill.

BOOMTOWN, Colorado—Denver job columns airmailed $1.00. Comanche, Box 7817, Lakewood, Colorado.

FLORIDA and Foreign Jobs, have hundreds of contacts. Clerical, Construction, Industrial, Hotel, Sales, All other Types, Licensed-Bonded fifteen years, application and information $1.00. Satisfaction guaranteed. Box 1924, Jacksonville, Florida.

THOUSANDS of Men needed. Skilled Men to $8000 year, unskilled $5000—Women for office and factories—high pay. Act now. Send $1.00 to Job Application Service, P.O. Box 109, Los Angeles 53, Cal.

LOS Angeles. Complete help wanted columns of 2 largest Sunday papers Air-Mailed $1.00. John P. Nolan, Box 266, Norwalk, California.

FOREIGN Employment. U.S. companies need personnel. Now! Immediate information, listings, applications, $1.00. Additional free valuable information on booming Brazil, California, Florida, Hawaii, etc. Box 271K, Worldwide Job News, Temple City, California.

10,000 LAKES! Minneapolis help wanted columns $1.00. Miller, 3 No. 11th, Minneapolis, Minnesota.

BUFFALO, Tucson, Norfolk, Help Wanted Columns air mailed $1.00. McRae, 22 Evans, Williamsville 21, New York.

POPULAR SCIENCE OPPORTUNITIES

$1300.00 MONTHLY for truck drivers, $1400.00 monthly for carpenters, electricians, plumbers, mechanics, $1200.00 for clerks and laborers. Replacement hiring now being done. Full information and complete foreign listings, with current information on Spain, Korea, Australia, Alaska & Canada, $1.00. 25,000 men and women needed for new stateside project! Complete information and other domestic listings, $1.00. Dept. 4-D. Opportunities Unlimited, 1110 Commerce Bldg., St. Paul, Minnesota.

FOREIGN and American Employment!! High Pay. Overtime work. Transportation expenses. Most all trades. Many average $1250.00 per month. Truck Drivers, Electricians, Plumbers, Carpenters, Mechanics, Clerks, Laborers. Names, addresses of firms hiring, application form, how to apply. If our service does not help you we offer Money Back guarantee. Complete List including one year registration and advisory service. Send $2.00 or C.O.D. plus postage. All replies sent same day order received. Associated Services, Box 58-TV, Alton, Illinois.

FOREIGN Job News and Domestic. Send $1.00 for World Wide Construction Projects, How-When-Where to apply. Global Reports Monthly, Box 883-Sx, Hollywood 28, Calif.

CHICAGO jobs, housing lists $1.00. Personal Service, 610 Jungels, Aurora, Ill.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The June issue closes on April 23. Write today for order blank and free copy of booklet "How To Make Money Out Of Classified Advertising". O. K. Kelly, Classified Adv. Mgr., Dept. 454, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

43 AGENTS WANTED

START Your Own Business on credit. Your own boss. 1658 of our Dealers sold $5,000 to $27,500 in 1953. We supply stocks, equipment on credit. 200 home necessities. Sales experience unnecessary. Pleasant, profitable business backed by world-wide industry. Write Rawleighs, Dept. D-U-PSC, Freeport, Ill.

NEW Jobs open in selling! Send name, address for five free issues of Opportunity Magazine's money-making guide, listing hundreds of companies who'll pay you well, full or part-time. No experience needed. Opportunity, 28 E. Jackson, Dept. 18, Chicago 4, Illinois.

AGENTS—300% profit selling genuine gold window letters; stores and offices. Free samples. Metallic Sign Letter Co., 431-E North Clark, Chicago.

ABSOLUTELY Free—Sales Kit. Yours for the asking. Send postcard today requesting kit showing new line, belt buckles with your name or personal initials, cap badges, choice 3000 different emblems. Write Hook-Fast, Box 1425PS, Providence, R. I.

BE A Money Maker . . . Use your home as magazine headquarters. Liberal commissions. No experience—No capital needed. Everything furnished. Write for Free Catalog. McGregor Magazine Agency, Dept. 510A, Mount Morris, Illinois.

RUN a Spare-Time Greeting Card and Gift Shop at home. Show friends samples of our new 1954 All-Occasion Greeting Cards and Gifts. Take their orders and earn up to 100% profit. No experience necessary. Costs nothing to try. Write today for samples on approval. Regal Greetings, Dept. 216, Ferndale, Michigan.

AMAZING Discovery, Master Glaze, puts brilliant glass-like surface on cars. Free Sample, information. Big commissions. Master Glaze, Dept. 793, 7730 Harwood, Milwaukee, Wisconsin.

BUY Wholesale—25,000 items—Catalog 25c. Matthews, 1472-A7 Broadway, New York City 36.

BIG profits selling ties ($2.00 values) $6.50 dozen. Free catalog. Empire Cravats, 611 Broadway, New York 12.

AGENTS—Show America's leading Nationally Advertised line—Novelties, Gifts, Utility Items. 100% profits. Prospects Everywhere. Steady Repeats. Write today for sensational low prices, free literature. Charms & Cain, 407-PS-44 South Dearborn, Chicago 5, Illinois.

GOLD or Silver letters, numbers. Windows, Doors Trucks. 1" to 6". 500% Profits—Free Samples. Atlas-U, 544 West 79th, Chicago 20.

BIG Money making opportunity. Exclusive line work uniforms. Jackets, pants, shirts coveralls. Advertising embroidered. Every business prospect. Outfit Free. Master Div., 159 Water, Ligonier, Indiana.

MY Free Outfit Puts You In a Fine Business! Just 2 sales a day brings you up to $217 extra a month in Big Money shoe business! Complete line of Air Cushion shoes for men, women. Just rush postcard for your powerful Free Selling Outfit! Mason Shoe Mfg. Co., Dept. MC-6, Chippewa Falls, Wisconsin.

CALENDARS, Advertising Novelties, Matches. All styles, including Religious, Varnished, 12 sheet, Girls. Hundreds of Advertising Novelties, Book Matches, etc. Fleming Calendar Co., Promotional Division, 6539 Cottage Grove, Chicago 37, Ill.

SHINE Cars Without "Polish". New invention. Lightning seller. Cars gleam like mirror. Samples sent on trial. Kristee 55, Akron, Ohio.

ADDRESS advertising postcards. Must have good handwriting. Lindo 504, Watertown, Mass.

MAN to earn $150 and up per week. Long needed invention. Advertised worldwide. Prospects are everywhere. Full or part time. Exclusive. No investment. Free samples. Write Red Comet, Inc., Dept. 341-K, Littleton, Colorado.

START Your Own Business. No investment required. Buy name brand items wholesale. Big profits! Send for free details. Public's Wholesale Buyers Guide, 14B Box 247, New Braunfels, Texas.

MAKE Money Introducing World's cutest children's dresses. Big selection, adorable styles. Low prices. Complete display free. Rush name. Harford, Dept. L-5341, Cincinnati 25, Ohio.

FREE hosiery! Sensational new way to earn $1 hour in spare time! Introduce amazing hosiery by giving away free pairs to every man and woman (regardless whether or not final purchase is made) just to prove how good they are! Wonderful luxurious nylon stockings, guaranteed against runs and snags, nationally known—sold coast to coast. New miracle one size two-way stretch men's nylon hose, contains no elastic, yet fits every size foot from 9 to 14! Never sags or droops—clings to foot like second skin—Outlasts several pairs ordinary hose and guaranteed one full year! Money or experience unnecessary. Buy nothing. Deliver nothing. Advance cash plus huge cash bonus to 40%. Your own hose as extra bonus. Special manager plan so you can appoint agents. Nothing like this ever offered before. Samples of stockings and miracle socks with complete money-making outfits free and prepaid. Nothing to pay now or later. Absolutely no obligation. Simply mail postcard with your name and address. Kendex, Babylon 34, New York.

GET New Shirt Outfit Free; make $90.00 weekly on 5 average orders a day. Famous quality Made-To-Measure dress and sport shirts at $3.95 up sell fast to all men. No experience needed. Full or part time. Write: Packard Shirt Co., Dept. 636 Terre Haute, Indiana.

CALIFORNIA sweet smelling beads, sensational sellers. Particulars free. Mission, 2328P West Pico, Los Angeles 6, Calif.

EASY handwork makes fast-selling useful articles. Sample free. Sunmade Company, Brockton 64, Mass.

SALESMEN—$50.00 in a day definitely assured, selling brand new item going to every type of food and beverage store, factories, laboratories, hospitals, etc. Samples Furnished. Utility Durawear, 53 West Jackson Blvd., Dept. PS-4, Chicago 4, Ill.

NAMEPLATES, for Homes, Desks. Best seller. Free samples. Whitney Plates, West Springfield, Mass.

HAVE you spare time? Terrific lifetime income. International, 61B Roberts, Portland, Maine.

BALL Pens $10.00 Gross. Retractable Pens $2.50 Dozen. Needlebooks with Threader $6.25 Gross. Lutzker, 871B East 170th, New York City 59.

40% PROFIT. Power mowers. Push or self-propelled. Terms. Rotacut—PS, Excelsior Springs, Mo.

BEAUTIFUL Feather Pictures. 200% Profit! Free sample. Apartado 9036, Mexico 1, D. F.

LIFETIME vitamin business! Terrific profits! Earn $50 weekly spare time. National Health Products, 83 Barclay St., Dept. PSF-3, New York 7.

BUY Wholesale thousands nationally advertised products at big discounts. Free "Wholesale Plan." American Buyers', 629-S Linden, Buffalo, New York.

FREE book "505 Odd, Successful Businesses." Work home! Expect something Odd! Pacific-38C, Oceanside, Calif.

CASH in on tremendous demand for new low priced burglar alarm for cars, homes, farm buildings. Everybody wants one. 286% profit, unique sample offer. Northwest Electric Company, Pukwana, South Dakota, PS4-4.

MEN! Money! Miracle Spray-A-Tint tints windshields—gives marvelous glare-protection—plus new 1954 look! Sprays on in jiffy. Reduces glare from sun, snow, headlights, etc. Lasts for years. Auto, truck owners buy on sight! Profits 100% up! Spray-A-Tint, Dept. PS-4, Consumers Bldg., Chicago 4, Illinois.

IS $210 a week worth a postcard to you? Then rush card with name and address for special Free Trial Plan that sells amazing new Automatic Refrigerator Defroster "like hot cakes!" Write to Mr. Lewis, D-Frost-O-Matic Corp., Dept. N-103, 173 W. Madison, Chicago 2, Illinois.

SCHOOL Seniors—Have Fun and Spending Money!!! Be Popular With Your Classmates. Send Postal For Details. Craftcards, Box 235-M, Pittsburgh 19, Penna.

WHOLESALE Catalog, Appliances, cameras, watches, etc. Pette Company, 1554-PS W. 11th Street, Brooklyn 4, New York City.

MAKE Extra Money. Sell front door name plates to friends, neighbors. Retail $1.98—you make $1.00! Free selling kit. Modern Engraving Co., P.O. Box 194, Boston 14, Mass.

$1.00 PROFIT selling $2.95 photo enlargement offer. Allen Studio, Reigler Bldg., Little Rock, Arkansas.

A Successful Mail Order Business is based on the product. We believe we have that product. The Five Star Wonder Tool is demonstrated and sold on T.V. for $1.98. It sharpens knives, scissors, lawnmowers, etc. Cuts glass. We have priced these tools very, very low. Send $1.00 for two samples, five dollars for Doz. Gross lots $48.00. When your combined purchases total 10 gross we will send you a gross absolutely free. Send $15.00 for a sound movie commercial. You can use it for T.V. promotion or you can set it up in any Farmers Market, Super Market, Woolworths, Grants, Fair, Carnival etc. You'll have to rent a Movie Projection Machine. The film is made by a fast talking demonstrator. You'll be amazed how fast you can sell these tools. Now this is big big business. Don't pass it up. People are interested in this tool. Cash in on it. Albert Cahill Steel & Iron Works, Adams Avenue, Toms River, New Jersey.

POPULAR SCIENCE OPPORTUNITIES

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The June issue closes on April 23. Write today for order blank and free copy of booklet "How To Make Money Out Of Classified Advertising" O. K. Kelly, Classified Adv. Mgr., Dept. 454, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

44 HIGH-GRADE SALESMEN

AD Matches! Sell Amazing Designs—20, 30, 40 and 240-light book matches. Biggest spot cash commission; every business a prospect. Low prices for high quality. Repeats. Start without experience; men, women; full, part time. Buy Nothing! Sales kit furnished. Match Corp., Dept. PS-52, Chicago 32, Illinois.

ADVERTISING book matches—Cash in on big demand—sell Union label matches. Cuts for all businesses and political parties—Free powerhouse selling kit—low prices—protection guaranteed on repeat orders—Cash commissions. Superior Match Co., Dept. P-454, 7530 Greenwood, Chicago.

BIG Money. Every Car Owner Buys. Repeats. Wonder Glaze, Bay Port 16, Mich.

45 EDUCATIONAL & INSTRUCTION

USED Correspondence Courses and Books sold and rented. Money back guarantee. Catalog free. (Courses Bought.) Lee Mountain, Pisgah, Alabama.

HIGH School—No Classes. Study at home. Spare time. Diploma awarded. Write for Free catalog. HBA-35, Wayne School, 2527 N. Sheffield, Chicago 14, Ill.

BOOKKEEPERS! Increase your earnings! Operate your own simplified "Dollar-A-Week" Bookkeeping and Tax Service. Full or spare time. Details Free. No obligation. Ellis, Box 203, Cedar Grove, North Carolina.

WANT A Diesel Job? New Opportunities to increase income. Higher Pay. More Money. We can help you Qualify. Tools. Shop method home training. Write today! Diesel, Tractor, Heavy Equipment Division, Interstate Training Service, Dept. B2-D, Portland 13, Oregon.

COMPLETE Your High School at home in spare time with 57-year-old school. Texts furnished. No classes. Diploma. Information booklet free. American School, Dept. X446, Drexel at 58th, Chicago 37, Ill.

BE a Real Estate Broker. Study at home. Write for Free Book today. "G.I. Approved." Weaver School of Real Estate, 301 Law Bldg., Kansas City, Mo.

FINGERPRINTING course, $12.00. Details. Fingerprinting School, 414 South 10th Street, Bessemer, Alabama.

STUDY by correspondence for Doctor's degree in Psychology, Metaphysics, and Divinity. College of Divine Metaphysics, Dept. P-S, 2811 No. Illinois Street, Indianapolis 8, Indiana.

HIGH School diploma at home. Licensed teachers. Approved materials. Southern States Academy, Box 144 PX, Station E, Atlanta, Georgia.

INCREASE your word knowledge now! Colorful vocabulary taught through quizzes and games. Series A, $1.00. Mary Winter, 120 Union Street, Bluefield, W. Va.

PIANO Tuning Pays. Learn this profitable profession at home. Our Tonometer and mechanical aids make learning easy. No knowledge music necessary. Diploma granted. Largest and oldest school—56th year. G. I. Approved. Write for booklet. Niles Bryant School, 77 Bryant Bldg., Washington 16, D. C.

PRACTICAL Nursing—Learn Easily at Home. Spare Time. Big Demand, good earnings. High School not necessary. Write for free facts. Wayne School, Dept. FH-22, 2525 Sheffield, Chicago 14, Ill.

OPERATE a Collection Agency Business. Very Profitable. Easily learned. Write Cole & Associates, Syracuse 2, New York.

MEDICAL Laboratory Technicians in great demand. We train you in your own home. Catalogue free. Imperial Technical Institute, Box 973-B, Austin, Texas.

WELDING training pays at Hobart Welding School. Box P-441, Troy, Ohio. VA Contract. Best equipment. Catalog Free.

BECOME a Doctor of Psychology or Metaphysics. Learn secret of contentment, happiness. Win degree of PsD. or MsD. Solve mental worries. Free book. College of Universal Truth, 5038-K Broadway, Chicago.

EARN While You Learn Auto And Diesel Mechanics. Master this top paying trade. Many graduates earn $100 a week and up. Approved for Korean veterans. For free information write Dept. No. 262, Nashville Auto-Diesel College, Nashville 3, Tenn.

SIMPLIFIED method teaches algebra instantly. $1; guaranteed. Ziemben, 6123 Orchard, Dearborn, Michigan.

FREE home study course in basic economics, offered as a public service. Recommended by many leaders. Send postcard for complete information. Henry George School, Dept. P, 50 E. 69th Street, New York 21, New York.

U.S. Civil Service Jobs! Start high as $316.00 month. Men-Women, 18-55. Qualify Now! 30,000 jobs open. Experience often unnecessary. Get Free 36-page book showing jobs, salaries, requirements, sample tests. Write: Franklin Institute, Dept. M-22, Rochester, New York.

MINISTER'S—laymen's religious courses. Free Bulletin! Midwestern Schools, 517 Merchants Bank Building, Indianapolis, Ind.

LEARN real estate business. Highly profitable. Easily learned, complete home-study course. Cost surprisingly low. Diploma awarded. Write for free literature. Seavy Realty Institute, Dept. S, 1750 Colorado, Los Angeles 41, California.

INCREDIBLE! Become Mental Superman Overnight! Free Booklet! Bijou, Box 1727-VH, Hollywood 28, California.

LEARN Drafting—Write for free booklet, "Drafting Opportunities In Industry." Cesco Industrial Training Services, 1704-B Frederick, Fort Worth 7, Texas.

RECOGNIZED College Degrees through Home Study. Tahoe Colleges, 510 W. Fuendo, Reno, Nevada.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 180, 2954 Admiral Way, Seattle, Washington.

LEARN mathematics at home. Individualized instructions. NCS, Box 27, St. Johns Station, Brooklyn 13, New York.

PROFITABLE Diamond Facts—Send only $2.00 includes wholesale catalogue. Jonrue Enterprises, Donora 12, Pa.

EDUCATIONAL books, correspondence courses, bought, sold, rented, catalog. Willard Bayles, 211 Essex, Hackensack, N.J.

ELECTRONICS, drafting, blueprint reading, mathematics, physics, etc. Individual, personalized instruction. Low cost. Write: Technical Instruction by Correspondence, Box 69, Cambridge 39, Mass.

POPULAR Piano, Rapid Course. Young Studios, 7051 Middlepointe, Dearborn, Mich.

CORRESPONDENCE courses, books, rented, sold, bought. Catalog free. Magnolia Press, Box 1272-S, Burbank, Calif.

STRUCTURAL drafting. Home study. Roth Tech, Box 2283, Youngstown 4, Ohio.

MIRACLES via Subconscious Control. Free Autodynamic Brochure. Box 847, Ocean Park, Calif.

A-B-C, of electrons, atoms, molecules. Entirely new approach of atomic behavior, their electro magnetic forces and differences in field forces, which combine electrons to atoms, molecules, liquids, solids. The lightspeed enforcers, cause of energy releases in molecular or nuclear reactions, structural outline of atoms, many illustrations, simple mathematics. $2.50 postpaid. Frank Graser, 28 Lee Ave., Lindenhurst, New York.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The June issue closes on April 23. Write today for order blank and free copy of booklet "How To Make Money Out Of Classified Advertising" O. K. Kelly, Classified Adv. Mgr., Dept. 454, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

46 CONTESTS

$1,500 PROSPERITY contest, everyone eligible, useful gift, details, stamp. Nestle, Sanford, Michigan.

SURPRIZES Galore!!! Fabulous Home Income Opportu'ty! Long established contest hdqtrs. Send stamp! National Contest Bulletin, Box 2685-PS, Miami 16, Florida.

47 DETECTIVES

DETECTIVES—Work home—Travel. Experience unnecessary. Detective Particulars free. Write, Wagoner, P-125 West 86th, New York 24.

DETECTIVE Training. Phillips Secret Service System, 1917-C North Kenneth, Chicago 39, Ill.

INVESTIGATOR Training. Experience unnecessary. Many opportunities. Send for Free particulars. Also credentials. Exchange Secret Service System, 4360 Broadway, Chicago 13, Illinois.

48 LANGUAGE OUTFITS

IT'S Fun learning a language by Linguaphone. At home, in leisure time, quickly, easily master French, Spanish, German, Russian, Japanese—29 languages by Linguaphone Conversational Method. Save time, work, money. Send for Free Book. Linguaphone Institute, 5404 RCA Building, New York 20.

50 BUSINESS SERVICE, INFORMATION, NAME LISTS

MAILING Lists, most any classification. 1000 names $5.00. 1000 your circulars mailed with ours $4.00. 5000 your circulars printed and mailed $12.95. Write Dixie Mailers, King, North Carolina.

PHILADELPHIA help wanted columns, any local information airmailed $1. Remailing service. Viking, Box 67, Paoli, Pa.

51 SPECIAL SERVICES

SOCIAL-Security rights, benefits explained $1.00. Quinn, 1218 South Clayton, Denver 10, Colorado.

STAMPED letters forwarded from Schenectady, 25c coin. E. Weir, 1319 Broadway, Schenectady, New York.

WILL send 7 Historic New Orleans cards $1.00. Address and return. Remail New Orleans Postmark. Letters 25c. Turay, Box 1471, New Orleans, La.

BIBLE Questions answered. Jon. Ferguson, 116-14 141 Street, So. Ozone Park 36, New York.

LETTERS remailed your choice Brasil—Trinidad — Venezuela — Uruguay — Argentina. $1.00 Postcards 2 for $1.00. Szabo, Avenida Atlantica 792, Rio de Janeiro, Brasil, S. A.

PLEXIGLAS sheets cut to size. Edins Service Specialties, Abilene, Texas.

52 AUTHORS SERVICE

NO luck finding a book publisher? Write for Free Booklet P9. Vantage Press, 120 West 31st, New York.

BEGINNING Writers: Get $1 to $20 checks daily writing simple children's stories, articles, poetry in your sparetime. Experience unnecessary. Our instructions reveal how. Details Free. W. Herman, 5927 Euclid, Cleveland 3, Ohio.

POPULAR SCIENCE OPPORTUNITIES

HOW To Write short stories, mysteries, articles. Learn at home for career or extra part-time income. Graham Doar sold one story to Post, CBS Radio and NBC-TV. Professional writers show you how. Send today for free lesson. Palmer Institute of Authorship. Desk UM-44, 1680 North Sycamore, Hollywood 28, California.

I Want New Writers—Experience unnecessary. Earn at home, spare time. Details Free. Saunders Cummings Institute, P.O. Box 17007, Studio D-15, Los Angeles 17, Calif.

53 ADVERTISING

ADDRESS advertising postcards. Must have good handwriting. Lindo 504, Watertown, Mass.

500 RADIO Stations which accept advertising on commission and 200 Magazines which give Free publicity. Including instructions "How"—$2.00. Satisfaction guaranteed. Brass, Box 1664-PS-4, Chicago 90.

ADVERTISE: 24 words, 100 Canadian Newspapers $5.50. Lists Free. Advertising Bureau, 10511-P Springfield, Chicago 43.

54 CARTOONING, SIGN PAINTING, CHALK TALKS

"HOW To Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is free; no obligation. Simply address 'Cartoonists' Exchange, Dept. 194C, Pleasant Hill, Ohio.

CARTOONISTS: Amateur, Professional. Prepare for Animation with Max Fleischer's plan. Write Vera Coleman, 60 East 42nd Street, New York, N. Y.

CHALK Talks, Laugh Producing Program. $1.00. Illustrated Catalog 10c. Cartoonist Balda, Oshkosh, Wisconsin.

55 TYPEWRITERS & OFFICE MACHINES

TYPEWRITERS $22.50 up. Adders $14.25. Meier's, 118 Spruce, Wichita 7, Kan.

TYPEWRITERS, Printing Devices, Office Machines, supplies, appliances. Dixie Graph, King, North Carolina.

56 RUBBER STAMPS & OFFICE SUPPLIES

MAKE your own rubber stamps! New miracle self vulcanizing rubber stamp discovery! Complete kit and instructions $1.00 includes enough formula for over 100 rubber stamps. Amazing possibilities. Satisfaction guaranteed. No C.O.D.'s. Quik-Stamp 165 Juniper Road, Scarsdale, New York.

FREE Pad with 3-line stamp. $1.00, cash with order. Bailey's, Lewiston, Idaho.

3 LINES, $1.00. Fast Service! Catalogue. Johnson Press, Box 6-B, N.Y.C. 26.

57 PRINTING, MULTIGRAPHING, ETC.

BUSINESS Personal Printing. Catalogs Free. Howprint, 723-S Eunice, Webster Groves 19, Missouri.

BUSINESS printing. Reasonable. Samples free. McIlvaine, Box 86-PS, Brooklyn 30, New York.

JOB Printing—Letterheads—Envelopes—Circulars. Printing, 21 Barclay, Portsmouth, Virginia.

WE print anything! Large or Small Quantities. Describe your needs for free estimate. Samples. Wilcox, Nicholls 5, Georgia.

LETTERHEADS - Envelopes - Circulars. Literature. Jola Press, Box 501, Bristol, Conn.

ILLUSTRATED Postcards! $8.90 Thousand. Samples Free! American Devices Company, 164 Montague, Brooklyn 1, N. Y.

TWO color 8½x11 letterheads, 500—$3.50. Samples. D'Yarmett Service, Newark, Ohio.

BUSINESS printing, samples free. Barr-Lewis, 165 N. Union, Akron 4, Ohio.

50 NOTEHEADS and 50 Envelopes printed your name, address, phone. 75c postpaid. 500 each $2.00. DiBenedetto's Printers, Box 171, Chelsea, Mass.

PRINT without a Printing Press! Amazing New Method! Print colorful signs, banners, cards, posters, glassware—anything at home. Big profits $ $ $ $ $ Opportunity! We supply everything. Beautiful Sample, Home-Business Plan Free! Write Screen-Print Company, Los Angeles 15, Calif.

58 PRINTING OUTFITS, SUPPLIES

DO your own printing. Save money. Simple rules. We supply everything. Print for others; good profit. Raised printing like engraving, too. Have home shop. Details free. Kelsey Presses, V-8, Meriden, Conn.

MAKE Your Own self molding rubber printing cuts. Plexirubber, Argyle (2), Wisconsin.

PRINTING Presses, Type Supplies. Lists 3c. Turnbaugh Service, Loysville, Penna.

PRESSES, Supplies, Paper. Catalog 10c. Custom, Box 211-S, Springfield, Missouri.

YOUR Hobby Printing? Free, guide-Catalog world's finest small-cost printing outfits. Shows how:—print for yourself, save money; print for others, fine profit. Easy rules, print in 1 day. We supply type, presses, everything—factory-to-you. Do church, club, commercial work, greetings, etc. Write Craftsmen Mfrs., 533 Atlantic, Boston 10, Mass.

59 PATENT ATTORNEYS

C. A. Snow & Co.—S-427, Snow Building, Washington 1, D. C. Registered Patent Attorneys. Write for information.

INVENTORS. For "Invention Record" form, contact Carl Miller, Registered Patent Attorney, Woolworth Building, N. Y.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent. John N. Randolph, Registered Patent Attorney, 207 Columbian Bldg., Washington 1, D. C.

REGISTERED Patent Attorney offers services. Sanders, 6430 Evans, Chicago 37, Illinois.

INVENTORS: Learn how to protect your invention. Special booklet "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure together with "Record of Invention" form will be promptly forwarded to you upon request—without obligation. We are registered to practice before the U.S. Patent Office and prepared to serve you in the handling of your patent matters. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 42B-D District National Building, Washington, D. C.

INVENTORS—Send today for booklet "Patent Protection for Inventors" giving detailed patent information and preliminary steps to take toward patent protection, also "Evidence of Invention" form. Victor J. Evans & Co., 941-D Merlin Building, Washington 6, D. C.

"INVENTOR'S Guide" and "Record of Invention" free on request. Frank B. Ledermann, 154 Nassau Street, New York City.

INVENTORS—If you believe you have an invention, you should find out how to protect it. The firm of McMorrow, Berman & Davidson with offices in Washington, D. C., is qualified to take the necessary steps for you. Send for copy of our Patent Booklet "How to Protect Your Invention." We will also send you an "Invention Record" form. No obligation. They are yours for the asking. McMorrow, Berman & Davidson, Registered Patent Attorneys, 1435 Victor Building, Washington 1, D. C.

PATENTS—Irving L. McCathran, 316 McLachlen Bldg., Washington 1, D. C. Registered Patent Attorney.

INVENTORS: When you are satisfied that you have invented something of value write me, without obligation, for information as to what steps you should take to secure a Patent. Write Patrick D. Beavers, Registered Patent Atty., 988 Columbian Bldg., Washington 1, D. C.

60 FOR INVENTORS

INVENTORS. For "Invention Record" form, contact Carl Miller, Registered Patent Attorney, Woolworth Building, N. Y.

INVENTORS—Send for free patent information book and inventor's record. Registered Patent Attorney, Associate Examiner, Patent Office 1922-1929; Patent Attorney & Advisor, Navy Department 1930-1947. Gustave Miller, 44PSI Warner Building, Washington 4, D. C.

INVENTIONS Promoted. Patented or Unpatented. Established 1911. Write Adam Fisher Company, 5418 Idaho, St. Louis, Mo.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent on your invention. John N. Randolph, Registered Patent Attorney, 206 Columbian Bldg., Washington 1, D. C.

INVENTORS, if you have an invention for sale, patented or unpatented, write Institute of American Inventors, Dept. 30A, 631-E St., N.W., Washington 4, D. C.

43 THINGS to do before applying for patents. Free information. Fred C. Roth, 657 East 26 St., Brooklyn 10, N. Y.

INVENTORS: Learn how to protect your invention. Special booklet "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure together with "Record of Invention" form will be promptly forwarded to you upon request—without obligation. We are registered to practice before the U. S. Patent Office and prepared to serve you in the handling of your patent matters. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 42A-D District National Building, Washington, D. C.

INVENTORS—If you consider your invention to be something of importance, take steps to protect it with a United States Patent which gives you the right to exclude others from making, using and selling your invention as claimed. "Patent Protection for Inventors" outlines steps to take to secure patent protection. Mailed promptly without obligation. Victor J. Evans & Co. Merlin M. Evans, Registered Patent Attorney, 942-D Merlin Building, Washington 6, D. C.

INVENTORS—If you believe you have an invention, you should find out how to protect it. The firm of McMorrow, Berman & Davidson with offices in Washington, D. C., is qualified to take the necessary steps for you. Send for copy of our Patent Booklet "How to Protect Your Invention." We will also send you an "Invention Record" form. No obligation. They are yours for the asking. McMorrow, Berman & Davidson, Registered Patent Attorneys, 1434 Victor Building, Washington 1, D. C.

"INVENTOR'S Guide" and "Record of Invention" free on request. Frank B. Ledermann, 154 Nassau Street, New York 38, New York.

COMPLETE services for inventors. Protection forms free. Inventor's Service, 4217 S.W. Corbett, Portland, Oregon.

CASH For your ideas. 280 Manufacturers need inventions, patented or unpatented. List free. Invention Bureau, 208-S Clinton, Oak Park, Illinois.

PATENT Searches, $5.00, including patent copies. Same reliable search as conducted for patent attorneys. Free protection forms, prompt efficient service. Patent Service Institute, 945-B Pennsylvania Avenue, Washington 4, D.C.

INVENTORS: To get the most out of your ideas or inventions, write us. If desirable, we will buy outright, contract on royalty basis, or sell to the proper manufacturers for you. Chisholm Industries, Inc., Box 265, Lynn, Mass.

POPULAR SCIENCE OPPORTUNITIES

INVENTORS and Manufacturers: We specialize in building ideas into working models. Wirsig Products Co., Deepwater, Missouri.

SEARCHES—Put your patent searches in the hands of a Registered Patent Attorney or Agent as he qualifies to give a worthwhile patentability report. Record of invention form upon request and information on patent protection. Patrick D. Beavers, Registered Patent Attorney, 939 Columbian Bldg., Washington 1, D. C.

PATENT Searches $5.00. 48-hour service. Patent Applications prepared. For free Record of Invention write Miss Ann Hastings, P. O. Box 176, Washington 4, D. C.

PATENT Searches $5.00. Reports airmailed in 48 hours. Patent Applications prepared. Free Record of Invention. Write Raymond L. Smith, Patent Searcher, 622 Sheraton Building, Washington 5, D. C.

PATENT Searches $5.00, 48-hour airmail service. Patent Applications prepared. Invention protection forms free. Write Patent Engineering Service, 711 14th Street, N.W., Washington 5, D. C.

PERPETUAL motion machine plans. Magnetically operated. Instructions and diagrams. $1.00. Ideas, 310 Harlem, Glenview, Illinois.

OBTAIN patents yourself. Eliminate attorney's fees. Information $2.00. Satisfaction or money refunded. D. Davidson, 11525 31st N.E., Seattle 5, Washington.

PATENT Drawings prepared—International Patent Drafting Service, Box 134, Dayton 1, Ohio.

61 INVENTIONS WANTED

INVENTIONS wanted. Patented; unpatented. Tremendous Manufacturers lists. Global Marketing Service, 1404 Mitchell, Oakland 1, Calif.

INVENTIONS promoted. Patented or Unpatented. Established 1911. Write Adam Fisher Company, 5418 Idaho, St. Louis, Mo.

INVENTORS: Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information free. Institute of American Inventors, Dept. 30C, 631—E Street, N.W., Washington 4, D. C.

INVENTORS: If your invention is adaptable to our business we will contract on cash or royalty. If not, we will try to place. Write Kessler Sales Corporation, 74A, Fremont, Ohio.

INVENTORS Don't sell your invention Patented or Unpatented until you receive our offer. write Cowgill, Box 298, Marion, Ohio.

WILL public Buy your idea? Our 3 stores in Burbank and Los Angeles will exhibit, "test-sell" and send you written report on public reaction to your item—Anything—No Cash expense. Write air mail, give particulars. Xibit-Marts, Inc., Established 1947, 3425 W. Victory Blvd., Burbank, Calif.

INVENTIONS Wanted. Patented or Patent Pending. 23 years experience Promoting Inventions. National Service Bureau, 3122 Meramec, St. Louis 18, Mo.

INVENTIONS wanted. Patented, unpatented. Write Superior Inventions, 240 South Beverly, Beverly Hills, Calif.

INVENTIONS Wanted. Patented. Pending only. Inventors Patent Exchange, Hartford 1, Conn.

CASH buyers for ideas and inventions. Write National Inventors Institute, 4097 East 131st Street, Cleveland 5, Ohio.

INVENTIONS Wanted. Patented, unpatented. Send for free form "R." Gilbert Adamec, Patent Broker, 15 Park Row, N.Y.

INVENTIONS, Ideas, financed and promoted. Replies confidential. No obligation. Write McRobbins Sales Co., Box 448, Ravenna, Ohio.

63 MANUFACTURING

WE design, develop, build. Machinery, inventions, Models. Henry, Engineer, 2815 Blvd., Jersey City 6, New Jersey.

RUBBER Stamps. Dating, Addressing, Indelible Marking. Royal Forde, West Sand Lake, New York.

64 MODELS, MODEL SUPPLIES

BUILD Historic ships, vehicles. 50c to $9.00 kits. Illustrated Catalog 10c. Ideal Models, 19 West 18th Street, New York 11.

SHIP and Yacht model fittings; blueprints. Send 25c for illustrated catalog listing hundreds of items. A. J. Fisher, 1002-2 Etowah, Royal Oak, Mich.

SHIP and other scale models. Most complete line in New England. Kits, fittings, plans, books, tools, engines, motors. Illustrated catalog 25c. James Bliss & Co., Inc., Dept. PS54, 342 Atlantic Ave., Boston 10, Mass.

1954 CAR models. 1/25 scale, all metal, chrome trim. Send for catalog. Cars & Hobbies, Dept. PS-16, 2333 Haddon, Chicago.

LIVE Steam Engine, 10½" high, ready-to-run, $5.95 postpaid. Catalog 35c. Merlo Company, 50-18 94th Street, Elmhurst 73, New York.

STEAM engines, boilers, castings. Catalog 25c. Anton Bohaboy, 2297 Price, Rahway, N. J.

POWER Models. Unusual steam, gasoline and traction engines, fittings, metals. Anniversary catalog 50c. Charles Cole, Ventura, Calif.

SHIP Models Ltd. Kits, Fittings, Plans. Stuart-Turner Steam Engine Castings. 1954 Catalog 25c. Box 225, Andover, Mass.

65 HOME CRAFTSMAN

90 ALL new full size lawn ornament and novelty patterns up to 20" high. Only $1.00. Mastercraft 428, 7041 Olcott, Chicago 31, Illinois.

"TOPS" in everything for Leathercraft. Lowest prices. Genuine "Craftool" stamps. Catalog 10c. Crown Leather Company, 22 Spruce Street, New York 38.

LEATHER, tools, lacing, supplies. Free Catalog. National Handicraft, 199 William St., New York 7.

"PRACTICAL Painting, Wood Finishing" shows how to get professional results. Furniture finishing, workshop projects, home decorating. Complete Modern brush and spray methods. Tricks you've never seen. Write Home Craftsman, 115-F Worth St., N. Y. 13.

PLASTICS home-craft course for Men and Women. Tells and shows how to make hundreds of fast selling plastics products. All plastics and materials for 23 projects included in course. No special tools needed. Course pays for itself. Write for Free booklet. Interstate Training Service, Dept. D2-D, Portland 13, Oregon.

LEATHERCRAFT. Tremendous stock of leather, tools, supplies and kits. In leather business over forty years. Send 10c for big catalog. Sax Bros., 1111 No. 3rd, Dept. PS4, Milwaukee 3, Wisconsin.

LEATHERCRAFT, Metal Tooling, Textile Painting, Beadcraft, Shellcraft, many other crafts. Fun, easy, profitable! Free, big, illustrated catalog. Write today. Kit Kraft, Dept. 354, Hollywood 46, Calif.

ASSEMBLE Jewelry, gifts. Free Catalog details. Novelcrafts Co., 25B Adrian Ave., New York 63, New York.

NEWEST Spare, Full-Time Business. $5 to $10 hour possible. Paint with Suede—the finish with touch and eye-appeal. Beautify auto dashboards, signs, radios, toys, figurines, lamps—100 others. Complete, Step-By-Step Instructions sent for no-risk examination. Free details. Coast, 1004-ST, So. Los Angeles St., Los Angeles 15.

LEATHERCRAFT For Pleasure or Profit. Make easy-to-assemble purses, belts, gloves, woolskin toys, 100 other items for gifts or to sell. Send 10c today for big catalog. Largest Leathercraft Stock in U.S. J. C. Larson Co., 820 S. Tripp, Dept. 3954B, Chicago 24.

"NOSLIPNOMOR" pad on mitre gauge insures accurate mitre cuts mitre size pad 25c. Lee, Box 228, Rochester 17, New York.

FURNITURE labels on antique paper. Hundred for dollar. Miriam Peryam, Encampment, Wyoming.

89 FULL size Jig Saw patterns of beautiful shelves, ornaments, toys, novelties plus "How, Where to Sell." Only $1.00. Mastercraft 448, 7041 Olcott, Chicago 31, Ill.

HOBBYISTS. Machinists, Rods, sheet aluminum, brass, steel, stainless, catalogue. Arcy Company, Lynbrook 1, New York.

103 NEW jig saw patterns for lawn figures, boats etc. Free ball pen, only $1.00. Andco, 1488 South, Toledo, Ohio.

SQUAREKNOTTERS: Make belts, handbags, lanyards, dog leashes, etc. Special offer! Beginner's book, catalog and quality cord samples 15c. P. C. Herwig Co., Dept. P41, 39 Henry St., Brooklyn 1, New York.

LEATHERCRAFT "Do - It - Yourself" Catalog Free! Write today! Tandy Leather Co., Box 397H, Tulsa, Oklahoma.

WRITE for new catalog, 1500 patterns, designs, Craftplans, 1321-B South Michigan, Chicago 5.

METAL—Rounds, flats, sheets. Small order inquiries invited. Tools. Will's Crafts Service-PS, Box 3922, Detroit 27, Mich.

LEATHERCRAFT—Spring punch makes oval lacing holes. Free Literature. Alfred Mullin, 972 Harliss Avenue, San Jose 10, California.

BUY wholesale nationally advertised power, hand tools, thousands other products at big discounts. Free "Wholesale Plan." American Buyers', 630-S8 Linden, Buffalo 16, New York.

LEATHERCRAFT, New Stylecraft folder Free. New Kits illustrated. Filigree Belts, Billfolds, Purses, etc. Send 25c new catalog. Refunded first order. Apache Leather Co., 2804 East Washington St., Phoenix, Arizona.

VIOLINMAKERS, Amateurs, Professionals, fine tone European wood. Materials, supplies, tools, patterns, instructions. Illustrated catalogue 10c refundable. Premier Violin Supplies, Dept. VPS, 430 South Broadway, Los Angeles 13, Calif.

KNOCKDOWN cedar chest and lumber free price list. Bedford Lumber Company, Shelbyville, Tennessee.

KNOCKDOWN Cedar Chest, Lumber and Veneers. Free Price List. Giles Co., Brownsboro, Alabama.

MAKE your own! Assemble America's most beautiful aluminum door canopies and window awnings. The sides are pre-assembled. Save 50%—Factory to you. Free Measuring Chart & literature. Herbert's Aluminum Awnings, Dept. 2, 8974 St. Charles Road, St. Louis 14, Missouri.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The June issue closes on April 23. Write today for order blank and free copy of booklet "How To Make Money Out Of Classified Advertising". O. K. Kelly, Classified Adv. Mgr., Dept. 454, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

CRAFTSMEN—Remove rust, corrosion from tools and equipment safely, easily. Prevents further rusting under normal conditions. Prepares metal surfaces for perfect bond with paints. Get professional finish. $2.00 bottle concentrate makes 2 gallons. Met-L-Klean, 3725 Riverside, Muncie, Indiana.

LEATHERCRAFTERS: Big illustrated catalog of materials, tools, kits, 10c. Art's Leather, 411 Joseph Ave., Rochester 5, N.Y.

WOODEN contour chair, full size plans. $1.00. Box 654, Oakland Park, Florida.

AWNINGS, cool, ventilated, Aluminum, wood frame, make your own, save, materials average window cost $5.00. Easily constructed. $250.00 weekly earnings, making and selling these beautiful awnings. Plans 50c. Coolshade Awnings, P. O. Box #341, Pawtucket, Rhode Island.

GLUE. Packaged at Bulk Prices; animal, casein, resin, liquid. Save up to 60%. Inquire. Minnesota Woodworkers Supply, Box 233, Hopkins, Minnesota.

LEATHERCRAFT Tools. Leather Embossing Plates. Craft Accessories. Dies. Catalogue 10c. Louis Jones Engineering Company, 1613 Main, Fort Worth, Texas.

LEATHERCRAFT Supplies. Pre-cut kits, tools, etc., large stock. Catalog 10c, refunded first order. Whitman Saddle Mfg. Co., 1725 Powers Street, D-4, Cincinnati 23, Ohio.

A Better Car For You! New 256-page book, "How To Take Care of Your Car" by famed Popular Science experts shows you easy ways to beat high cost of car care, repair. Over 750 pictures, hundreds of easy instructions on fixing, servicing saving on gas, more! Guaranteed! Only $2.49. Popular Science, Dept. 454C, 353 Fourth Avenue, New York 10, New York.

WREN House Kit Scientific Design Send $2.00. Dezwaans, Caledonia, Mich.

BEAUTIFUL cypress knees for lamps $1.00. Ralph Rife, Zephyrhills, Florida.

VENEERS, Single ply; Walnut, Mahogany, Birch, Oak, Cherry, 8c square foot, minimum 25 feet. Prepaid. No C.O.D.'s. Minnesota Woodworkers Supply, Box 233, Hopkins, Minnesota.

66 BUILD IT YOURSELF

LUMBER Core Plywood, ¾"; Walnut, Mahogany, Birch, Oak, Cherry. Cut exact size, guaranteed first quality, 68c square foot. No C.O.D.'s. Minnesota Woodworkers Supply Box 233, Hopkins, Minnesota.

$10,000 IN building materials for $100. Secret for $1. Hegel Associates, P.O. Box 68, Berkeley, Calif.

NEWEST Spare, Full-Time Business, $5 to $10 hour possible. Paint with Suede—the finish with touch and eye-appeal. Beautify auto dashboards, signs, radios, toys, figurines, lamps—100 1 others. Complete, Step-By-Step Instructions sent for no-risk examination. Free details. Coast, 1004-SH, So. Los Angeles St., Los Angeles 15.

POWER Mower Kits, free plans, instructions, parts list. Temco Mowers, Springfield 2, Missouri.

BUILD a treasure and metal detector. Lightweight, Sensitive, Inexpensive. Complete kits. Free Literature. Dept. H, Electronic Applications, Box 4975, Washington 8, D. C.

GRANDFATHER Clock shoptested plans dollar. Thousands built. Kuempel Clocks, Minneapolis 16.

ENSHRINE your heirloom pocket watch in miniature Grand-father's Clock. 12" high. Easily assembled kit prefabricated parts. Birdseye Pine, Redwood $3.50. Honduras Mahogany $4.00. Illustrated item leaflets 10c. Hill, 7224 Favor, Oakland, Calif.

BUILD inexpensive concrete blockmaker. Motor-Hand. Then, make blocks for 5 room house for $95. Write, Clyde Lee, Mountain View 1, Oklahoma.

SAVE Closet Space! Portable Shoe Rack; Keep pants neat Pants Hanger. Use our easy to follow You Build It Plans. 50 cents each. Victor Walz, 508 N. Maple, Carlsbad, New Mexico.

BUILD three bedroom rancher—large rooms—fireplace—only $1200. Plans $1.00. L. Minkoff, Box 52, Flushing, New York.

ELECTROPLATE baby shoes, auto parts. Profitable business. Details free. Easyplater, Box 293B, Red Lion, Pa.

GUARANTEED life-money-time saving electric flat tire detector. Inexpensive. Easily made and fit on all cars. Inquire Inventor; H. Ross, 31-59 45 St., L.I.C. 3, N.Y.

BELLOWS-fireplace-barbecue. Attractive kit. Easy to assemble, $4.95 postpaid. Satisfaction guaranteed. Greenleaf House, Box 95, Whittier, Calif.

BUILD Birdhouses. Large profits. Terrific demand. Plans and details $1.00. R. Brockway, Saybrook, Conn.

"CONCRETE Block Homes." 32-page booklet on how to build. $1.00. H. C. Lightfoot, Civil Engineer, Richboro, Penna.

PLYWOOD Desk-Table Tops, any size; guaranteed first quality. Walnut, Mahogany, Birch, Oak, Cherry. ¾"—68c square foot, 1⅛"—98c. No C.O.D.'s. Minnesota Woodworkers Supply, Box 233, Hopkins, Minnesota.

U-BUILD-IT Construction Set, a real homemaker. One set makes dozens of educational, practical, sturdy units for years of child and family use . . . playhouses, cabins, forts, stores, playpens, teeter-totter, picnic tables, etc. Easily made at home from 1" lumber, with simple system of inter-notching that makes assembling an intriguing activity without nails, pegs, or tools. For 16 page, copyrighted, illustrated booklet with blueprint, send only $2.00. U-Build-It, Wauseon, Ohio.

CABIN, cottage, hunting lodge, ranch house! Have any one with aid of amazing new book "How To Build Cabins & Ranch Houses"! 256 pages, 207 pictures, 17 different plans—any one worth more than 3 times the low cost of entire book! If not delighted return book for full refund. Send only $2.49 to Popular Science Dept. 454C, 353 Fourth Avenue, New York 10, N.Y.

67 OLD GOLD, JEWELRY, WATCHES, ETC.

JEWELRY making. Send 20c for illustrated catalog. Milady-Fair Co., G.P.O. 1328, New York City 1.

HIGHEST Cash Paid For Old Gold, Broken Jewelry, Gold Teeth, Watches, Diamonds, Silverware, Spectacles, Platinum. Free information. Satisfaction Guaranteed. Rose Refiners, Heyworth Building, Chicago 2, Ill.

FREE Sample pair of Earrings shows you how easy it is to make beautiful costume jewelry. Over 5000 styles listed in New Catalog—25c. Barry's, 179 Ardsley Court, Newark, New Jersey.

RHINESTONES, jewelry settings, cameos, sequins, beads. Send 10c for Illustrated Catalog. J & M Novelties, Dept. CD-4, Griffith, Indiana.

10 SWISS watches $18.00, catalog 10c. Berkowitz, 1150 Castlehill, New York 62.

GOLD, Silver and Old Jewelry. "How to Refine It." Illustrated. Make Alloys, Solders, Alloying all colors of Gold. Also, A Quick Test to Determine the Gold, Silver or Platinum Content of an Article, etc. in "The Jeweler's Melting Pot." Only $4.25 per Copy postpaid; Free Particulars. Frank J. Herman, 937 West 12th Street, Los Angeles 15, California.

68 TOBACCO & PIPES

PIPE Smokers! Cigar Smokers! Free illustrated catalog offers fabulous savings on choice imported and domestic pipes, cigars, tobaccos, supplies. Write Wally Frank, Dept. 2, 150 Nassau Street, New York 38, N. Y.

CHEWING—Smoking! Aired or fired cured. Samples 10c. Fred Stoker, Dresden, Tennessee.

69 FOR THE HOME

HOUSEHOLD repairs made easy—10 in 1—German tool kit—nickel plated—$4.95. Petkro Imports, Box 222, Ridgewood, New Jersey.

NOW, Asbestos cloth ironing board covers. This is must in every home. No more fires. No more replacing burned covers, just set your hot iron anywhere on board and forget it—you can't burn it! Send board length measurement and $5.95, (money order only) to: Asbestos Textile Products, P.O. Box 49, Fitchburg, Mass.

TERMITES, $2.00 for sufficient Pentapak make five gallons solution. Box 7111, Tulsa, Oklahoma.

CESSPOOLS, septic tanks, outdoor toilets cleaned, deodorized. No pumping, digging or moving necessary. Inexpensive. Details. Chemical Cesspool Cleaning Co., Boston 34, Mass.

KITCHEN cabinets for half. Information 10c. Stan, Box 91, Marengo, Wis.

FOAM rubber furniture cushions—Factory seconds 50% discount. Free catalog. Perma-Foam, 140-A Main Street, East Orange, New Jersey.

ALUMINUM Building Materials—Jalousie Windows $3.95 sq. ft., Doors $87.85; Reynold's Insulation $9.65 250 sq. ft. 25% with order. M. Steinman, 78-11 Kew Forest Lane, Forest Hills, New York.

70 OF INTEREST TO WOMEN

MAKE Big Money At Home! Invisible Reweaving pays $10.00 profit an hour spare time. Make tears, cuts, holes disappear from fabrics. Constant demand from laundries, cleaners, homes assures steady earnings. Details Free. Fabricon, Dept. D, 8342 S. Prairie, Chicago 19, Ill.

COMPLETE quality line artificial florist supplies. Woodfibre, leaves, centers, novelties. Catalog 10c. Profitkrafts, 4510D22 Lorain, Cleveland 2, Ohio.

NYLONS 14c, Anklets 6c, Socks 9c, Print 17c, Panties 12c, Dresses 50c, Slips 47c, Undershirts 17c, Robes $1.65, Spreads $2.65, Jewelry $1.25, Watches $3.50, Electric Razors $2.00, Aspirin $1.00-1,000, Brushes 9c, Razor Blades 1-1½c, Pens 8c, Combs 1-1½c. Complete stock list. Picture Catalogue 25c. Send immediately. Sibert'c, Chattanooga 4, Tennessee.

ADDRESS advertising postcards. Must have good handwriting. Lindo 504, Watertown, Mass.

HAVE gift shop in your home. Start small. Pleasant, profitable. We show you how. Berth, G.P.O. Box 1480-S, New York 1, New York.

THE fullest blessedness and happiness in the home can be attained with Character building. Christian Courtesy Plaques; positive, negative qualities. 300 words on beautiful surfwood. $2.50 postpaid. P. C. Sanborn, 4624 Lovington Rd., Des Moines 10, Iowa.

WONDERFUL "Beater Shield" prevents electric mixer splashings. Save cleaners bills. 60c. Post, 1257 South Columbine, Denver, Colorado.

EARN $50 weekly spare time selling vitamins! National Health Products, 83 Barclay St., PSW-3, New York 7.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 181, 2954 Admiral Way, Seattle, Washington.

71 FOR SALE MISCELLANEOUS

FREE 1954 catalog on government surplus bargains from country's largest surplus organization specializing in outdoor, sporting goods, clothing, camping equipment, Tents, rubber boats, tarpaulins, swim fins, hundreds of other items. Rockaway Sales Co., Box PS, Route 46, Rockaway, New Jersey.

NAMES 1000 Women Buyers $5.00. Welch's Variety Store, Bulls Gap, Tennessee.

100 MONEY-Making Plans $1.00. Empire Distributors, Box 301, Amesbury 2, Mass.

WONDER Cushion. Pocket size, inflates full size! Deflates. For home, factory, sporting events, serviceman gift, etc. $1.00. Or details. Marvall Products, 168 McArdle, Rochester 11, New York.

$1,000,000 TRUCKS, jeeps, Tools, Mach. etc., being sold by Government annually. For details, Send $1.00. Surplus, Box 213, East Hartford, Conn.

72 WANTED MISCELLANEOUS

SCRAP Mercury (Quicksilver) containers supplied. Tantalum—Bismuth—Tungsten. Metallurgical Products Co.—Established 1909, 35th & Moore Streets, Philadelphia 45, Pa.

QUICKSILVER, Platinum, Silver, Diamonds. Prompt Payment. Mercury Terminal, Norwood, Massachusetts.

CASH for books, records. Dollar for pamphlet list. D. C. Clayton, Conover, O.

73 WEARING APPAREL

WORK clothes below wholesale cost. Quality cotton pants 89c, shirts 79c, coveralls $1.69 and shop coats $1.59. All clothes reconditioned, sterilized. We will ship anywhere. COD. Write Eastern Processing Co. Box C, Franklin Station, Baltimore 23, Md.

75 TATTOOING SUPPLIES

TATTOOING Course and Supply Brochures. 25c. Zeis School, 728 Lesley, Rockford, Illinois.

POPULAR SCIENCE OPPORTUNITIES

77 TREASURE FINDERS

GOLD, Silver, Metal Detectors, Geiger Counters for Uranium, Mineralights. Sensational new fully guaranteed models. None Finer. Information Free. Detectron Corp., 5420 Vineland Ave., North Hollywood, California.

TREASURE Hunters! New 11-pound featherweight Model 101 locator for gold, silver and minerals. Money-back guarantee best available. Also Geiger Counters for uranium prospectors. Complete information free. The Goldak Company, 1540 W. Glenoaks Blvd., Glendale 1, Calif.

SELECTIVE metal and mineral detector. Revolutionary design. Distinguishes metals from black magnetic sands. Readily detects metals under salt water. Also Geiger Counters. Free literature. Gardiner Electronics Company, 2018 N. Dayton, Phoenix, Arizona.

LOCATE Hidden treasure, distinguish minerals from metals with Model 100 Detector. Weighs 5 pounds, extremely sensitive. Factory assembled ($79.90) or kit form ($39.90). Free Literature. Dept. G, Electronic Applications, Box 4975, Washington 8, D. C.

TREASURE—M-Scope Geiger Counters—Mineral Locators. Why buy something inferior when you can buy the best at a lower price? Backed by years of experience. Fully guaranteed by factory. Detects minerals, metals, gold, silver, coins. Payment plan available. Proven superior performance. Free 16 page illustrated booklet. Fisher Research Lab., Inc., Palo Alto, Calif.

ATOMIC-Uranium Ore-making millionaires everywhere. Generous sample sent postpaid $1 so you can identify it and check your geiger counters. Box 970A, Colorado Springs, Colorado.

78 WATCH REPAIRING

WATCHMAKERS' — Jewelers' complete informative catalogue 20c. Bengal Company, Culver City, California.

WATCHMAKERS' Tools, Materials, Supplies. Watches. Catalog. Gales, Box 1000, Chicago 90, Illinois.

WATCHMAKERS! Beginners! Watches, Movements. Descriptive list. Box 150, Chicago 90, Illinois.

WATCH and clock repairing books for hobbyists. Free information. North American, Dept. 24-D, 2330 N. Milwaukee, Chicago 47, Illinois.

79 MISCELLANEOUS

OUTDOOR Toilets, Cesspools, Septic Tanks cleaned, deodorized with amazing, safe, harmless powder. Easy, economical to use. Saves digging, pumping. 150,000 customers guarantee satisfaction. Details Free. Burson Laboratories, Dept. O-53, Chicago 22, Illinois.

BUY wholesale cameras, projectors, appliances, giftware. Catalogue 50c (refundable). Dart, 3812F Atlantic Avenue, Brooklyn 24, New York.

HOME study for game warden, fish, park, forestry, wildlife and patrol service. Details free. Write Delmar Institute, A6, Whittier, California.

NEWEST Spare, Full-Time Business. $5 to $10 hour possible. Paint with Suede—the finish with touch and eye-appeal. Beautify auto dashboards, signs, radios, toys, figurines, lamps—100, 1 others. Complete, Step-By-Step Instructions sent for no-risk examination. Free details. Coast, 1004-SX, So. Los Angeles St., Los Angeles 15.

ADDRESS advertising postcards. Must have good handwriting. Lindo 504, Watertown, Mass.

TOWELS 12 All Purpose $1.00. Brazil's, 1940 S. Union, Los Angeles 7, Calif.

SURPRISE pack price 25c. Colombia Mailers, Box 644, Springdale, Conn.

MAGNETS—Permanent Alnico. Never loses magnetism. Many uses. Excellent for map, bulletin work. No. 3, 12 for $1.00. No. 5 stronger (magnetic pot holder magnets) 6 for $1.00. Quantity prices. Pritt Co., Dept. MS-4, 12 West 27th, New York City.

SURPRISE package. Worthwhile, interesting, unusual. 25c. Hilltop Specialty, Blackwood, New Jersey.

CASH or credit, nationally advertised merchandise, guaranteed absolute wholesale prices. Leopold's, Box 1113-A, Columbus 16, Ohio.

BIG interesting mails three months 25c, year $1.00. Harvey Teeple, Decatur, Ind.

BUY Wholesale thousands nationally advertised products at big discount. Free "Wholesale Plan." American Buyers', 631-E Linden, Buffalo, New York.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 182, 2954 Admiral Way, Seattle, Washington.

ASTOUNDING! Secret of Persuasion! Free! Amaze everybody! Dubois, 880 Churchill, Montreal 18, Canada.

RECEIVE Magazines, samples, catalogues. Mails from everywhere. Offers, hundreds. Get listed 25c. Rorick, Box 86-M, Cincinnati 26, Ohio.

SAVE Dollars—even hundreds! Sensational new booklet, "Electrical Pitfalls". A must if you plan to buy or build! Easy to understand, non-technical. Send $1.00. Moneyback Guarantee! Useful Products, Box 602J, Sacramento, Calif.

RENTING? Worried? Want a home? Let's build it, we'll help finance different methods. Send $1.00 for informative folio. United Home Builders Associates, Box 1707, Nokomis Station, Minneapolis 17, Minn.

300 BIG Mails guaranteed, samples, offers, plans, propositions, 12 months listing, $1.00 (refundable). Wright Publications, 2276 Hubbard, Memphis 8, Tenn.

YOUR name on numerous mailing lists—10c. L & M, Box 305, East Tupelo, Miss.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The June issue closes on April 23. Write today for order blank and free copy of booklet "How To Make Money Out Of Classified Advertising". O. K. Kelly, Classified Adv. Mgr., Dept. 454, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

80 PERSONAL

DETECTIVE'S Opportunities. Detective particulars free. Write. Wagoner, P-125 West 86th, New York 24.

"HOW Can I Find Out?" You Can! Information confidentially developed. Any matter, person, problem. World-wide. Officially licensed. Established 1922. William Herman, 170 Broadway, New York.

BORROWING by Mail. Loans $50 to $600 to employed men and women. Easy, quick. Completely confidential. No endorsers. Repay in convenient monthly payments. Details free in plain envelope. Give occupation. State Finance Co., 323 Securities Bldg., Dept. P-14, Omaha 2, Nebraska.

PSORIASIS Victims: Hopeless? New Discovery! Free Trial offer. Write Pixacol, Box 3583-S, Cleveland, Ohio.

ADDRESS advertising postcards. Must have good handwriting. Lindo 504, Watertown, Mass.

IF you are nervous, write The Herbmaster, Forestville 8, Virginia.

LETTERS Remailed 25c coin. 5 Virginia Beach Postcards, $1.00 remailed. Barnes, Box 226-S, Portsmouth, Virginia.

RUPTURED? Something different. Light. Cool. No leg straps. No elastic. No pressure on hips or spine. Inexpensive. Worn by Mechanics, Farmers, Doctors, etc., everywhere. Guaranteed. Write Hand-Lock Products, Dept. P.S., Preston, Ont., Canada. Established 1893.

LETTERS Remailed 20c. Literature Samples 10c. Persil, 436 N. Y. Avenue, Brooklyn 25, New York.

BORROW By Mail From Postal Finance Co. Employed Men and Women can easily obtain $50 to $600 Fast. Entirely By Mail. Repay in small monthly payments. Friends, relatives, employer, tradespeople will not know you are applying for loan. Advise occupation, amount wanted. Postal Finance Co., 200 Keeline Bldg., Dept. 13H, Omaha, Nebraska.

DARKEST Africa. Air remails $2.00 unique stamps. Scenic colour cards set $3.00. Picturesque scarves $5.00. Native beadwork $5.00. Green, Box 10476, Johannesburg, South Africa.

"INTERESTING Mails"—25c keeps your mail box full three months. Bentz Desk-J/46, Chatawa, Mississippi.

UNHAPPY? Restless? Dissatisfied? Uncover your hidden abilities, aptitudes, personality with psychological testings. Do test at home. Receive complete analysis prepared from tests by professional psychologists. Low cost, confidential. Write Psychologic Testing Institute, Dept. 20, 400 N. Rush St., Chicago, Illinois.

HAIR Growth Discovery. Literature $1.00. Fasyk Co., PS4, Toledo 8, Ohio.

HAND Guide. Corrects your Penmanship in 10 hours. Write Perfect Penmanship, Box 665-35P, St. Louis, Missouri.

FLUORINE, strong, healthy teeth. New discovery. Free literature. G. B. Supply Co., Box 3373, Los Angeles 54, Calif.

HOLLYWOOD, Los Angeles. Letters remailed 25c. Private receiving—forwarding address available scenic postcards. Nationwide worldwide remailing. Agents wanted. Details 25c deductable. Michaels, Box 1924-B, Hollywood 28, California.

LETTERS Remailed New York, 25c. Forwarding confidential. LoPresto, RD2, Wharton, New Jersey.

DRUG Sundries Wholesale. Men, Women. Illustrated list 25c coin. P. P. Ally, 1123 Ellicott, Buffalo 9, N. Y.

NIAGARA Falls remails 25c. EAC, 8400 Main, Clarence, New York.

INCREDIBLE! Become Mental Superman Overnight! Free Booklet! Bijou, Box 1727-VH, Hollywood 28, California.

12 MONTH forecast reading—covering finances, health, vocations, love and 6 questions answered $1.00. Give birthdate. Hoffman's, 5506 Fifth Avenue, Apt. 209-P, Pittsburgh 32, Pa.

STAMPED letters, cards remailed 20c each. Don Mitchell, Dumont, Iowa.

"X-RAY Mind." Dangerous power over others. (Details—10c). Krishnar Institute, 1912 Lincoln-Park-West, Dept. PX, Chicago 14.

MEXICAN Law. General Practice Attorney. 1203 Arizona Street, El Paso, Texas.

"BE Rich". Valuable book tells how to get what you want. "Master Plan for Success" included. Satisfaction Guaranteed. Send $1. Allen, 6711-B Sunset, Hollywood 28, California.

DENVER—Remails from Mile High City, 25c. Comanche, Box 7817, Lakewood, Colo.

REMAILING—New York 25c. Toronto, Honolulu 50c. Paris $2.00. F. Holmes, 152-D E. 27 Street, New York 16, N. Y.

SITZ Bath Rejuvenation! Means vitality restored. "Feel like a new person"—D. Work, Tennessee. "Glad I contacted you."—F.U., California. New scientific technique, easy to use. Sitz Bath Company, I, Allendale, New Jersey.

PERSONAL Problems—prompt, expert advice. Satisfaction guaranteed. Send $3.00 per problem. M. Sutker, (Consultant), 69 W. Washington, Chicago.

LOS Angeles Remailmails 25c. Strictly confidential. John P. Nolan, Box 266, Norwalk, California.

RENO—10 Scenic Postcards of Reno. You address and return for remailing here. Send $1.00 to Elmore's, 1455 Wesley Drive, Reno, Nevada.

WASHINGTON, D.C.—Letters remailed 25c. Rhodes, P.O. Box 8155, Washington 24, D.C.

DANDRUFF? Hair loss? Write: S. Vigliano, 6556 Ladson, Pittsburgh 6, Penna.

HANDWRITING analyzed $1.00. A. C. Bosnaian, 5236 Huntington Dr. (S), Los Angeles 32, Calif.

MOSCOW, Idaho, remails. Postmark 50c for letter. Inland Empire Enterprises, Box 251, Moscow, Idaho.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The June issue closes on April 23. Write today for order blank and free copy of booklet "How To Make Money Out Of Classified Advertising". O. K. Kelly, Classified Adv. Mgr., Dept. 454, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

BIGGEST SHOTGUN VALUE!

3-shot repeaters with C-LECT-CHOKE

Any choke desired, instantly, by a twist of the fingers. Settings are positive and visual, like a micrometer. NOT an "extra". You buy gun and C-LECT-CHOKE *installed* at these amazing prices—and there is no finer variable choke.

YOUR MOSSBERG DEALER WANTS TO SHOW YOU THESE

Drop in and have a look. You'll be delighted with the beauty, quality and fine balance of these guns.

Send for **FREE** *catalog*

No sales at factory

#183K, 410 ga. $28.95
#185K, 20 ga. . 29.95
#190, 16 ga. . . 31.95

(all $1 more west of Rockies)

Prices above are with C-LECT-CHOKE and ventilated barrel.

Mossberg *for accuracy*

O. F. Mossberg & Sons, Inc.
46504 St. John St., New Haven 5, Conn.

JITTERBUG

"TWO HOURS OF WONDERFUL FISHING"

"You never think of Colorado as a bass fishing state, but they're still here," write "Chick" Clark and Fred Livingston, Longmont, Colo. "We took these 11 bass (34 lbs.) on black Jitterbugs." Jitterbug's famous gurgling, paddling, wobbling surface action makes the big ones strike viciously. Casting size (5/8 oz.) or Peanut size (3/8 oz.) or Spinning and light tackle size (1/4 oz.)—$1.25 each. Musky size (1-1/4 oz.)—$2.00 each.

Choice of Body Colors

NOISY SURFACE BAIT

FREE WRITE TODAY FOR YOUR BIG FREE NEW 1954 COLOR CATALOG OF BAITS—FULL OF PICTURES OF CATCHES

FRED ARBOGAST COMPANY, INC.
2344 WEST NORTH STREET • AKRON 3, OHIO

ALWAYS READY TO GO!

no soaking • no caulking
LESS UPKEEP

Your Starcraft's ready always, even for in-and-out service. Choose from 14 styles, many sizes. Built of tough, lasting metal*, strongly reinforced. Designed for comfort and easy handling with oars or motors up to 25 h.p. Safe. Low priced. Ask for new free boat catalog today.

STARCRAFT *GALVANIZED STEEL, STAINLESS, ALUMINUM

Dept. N-4 Goshen, Ind. **METAL BOATS**

U-BUILD-IT TRAILERS FOR SPORT OR HOME FROM **$399**

A size for every need from 14' up. High strength steel prefabricated chassis and frame work. Factory made parts. No experience necessary. Kit of tools with electric drill furnished. Send 25¢ for sample plan and literature.

MIDWEST METAL PRODUCTS, Dept. 8
P. O. Box 272, Elkhart, Indiana

ALSO CHILD'S 2 PASS. MOTOR CAR For kids 5 to 15.

ESHELMAN HOLDS 1 ADULT

AUTO WITH MOTOR

WORLD'S LOWEST PRICE
70 Miles Per Gal. Gas—25 Miles Per Hour.

ESHELMAN, Dept. CM-64
119 Light St., Balto. 2, Md. 333 N. Michigan Ave., Chicago 1, Ill. 7070 Hollywood Blvd., L.A. 28, Cal.

Write for Free Literature

FINE BOWS and ARROWS
SELECTED RAW MATERIALS

Catalog 5c *Send for it*

HAND BOOK—Illustrated Instructions on Making and Shooting Archery Tackle—75c

L. E. STEMMLER CO.
Manorville (Box 1) L. I. N. Y.

Before You Buy Your Trailer—READ...

TRAILER TOPICS MAGAZINE

It brings you the latest in Trailer Coaches—Equipment—Accessories—Trailer Trips—Trailer Parks and many other interesting monthly features at only—$3.00 for 2 years.

(6 MONTH TRIAL SUBSCRIPTION $1.00)

TRAILER TOPICS MAGAZINE (Room 1587)
28 East Jackson Blvd., Chicago 4, Ill.

ROTO-HOE GARDEN TOOLS

Brings You the Easy

NEW and PROVEN WAY to buy POWER EQUIPMENT

Years of experience in perfecting **ROTO-HOE** plus plenty of "garden testing" by thousands of users, insures your satisfaction. Send for our new free 16-page full color catalog which can save you hundreds of dollars. Look at these **ROTO-HOE** advantages:

1. Low first cost, complete **ROTO-HOE** only $134.
2. Many thousands of satisfied customers.
3. Variety of low cost attachments to do extra jobs.
4. Minimum storage space needed—hang attachments from the garage wall.
5. Low cost replacement parts if ever needed.

You'll want to know more about just what **ROTO-HOE** and attachments can do to make gardening easier for you. Write today for free color catalog and name of nearby dealer.

START YOUR OWN BUSINESS. There may be an opportunity for you to start your own business selling and servicing **ROTO-HOE** in your community. Write for full details.

ROTO-HOE & SPRAYER COMPANY

Box 18 Newbury, Ohio

---

60 POWER TELESCOPE $3.98

VARIABLE EYEPIECE 20X-40X-60X—BRASS BOUND

NEW! Three telescopes in one. 3 different magnifications. 20 power for ultra-bright images with 40 and 60 power for extra long range. Guaranteed to bring distant objects, people, sports events, ships, moon, stars, etc. 60 times as close. Most powerful for anywhere near the money. 5 sections. Closes to 1 ft. long. Contains 4 ground and polished lenses. Also used as a powerful compound microscope. Direc tions included. Mass production enables us to offer this instrument at amazing price of $3.98 complete. Money back guarantee. We pay postage. Get yours now.

Criterion Co., 331 Church St., Hartford, Conn., Dept. PSB20

Catalog OF 3000 Novelties 10c

Send 10c for amazing catalog of novelties, live animals, scientific supplies, hobbies, funmakers, planes & boats, looms, magic tricks, joke articles, unusual seeds, gadget timesavers, cameras, optical goods, projectors, movies, lucky jewelry, religious novelties, disguises, musical instruments, stamps, coins, puzzles, fortune tellers, radios, auto & bike accessories, telescopes, magnifiers, compasses, banks, smokers' gadgets, artists' supplies, printing sets, engines, motors, shockers, knives, billfolds, fireworks, guns, rifles, sports, books, games, plants, etc. Send name, address & 10c to:

JOHNSON SMITH & CO., Dept. 794 Detroit 7, Michigan

RAISE PARAKEETS . . .

MAKE BIG MONEY AT HOME

Extra income is more important than ever! Turn your spare time and a corner of your garage into a fascinating and profitable hobby. No experience needed. Illustrated booklet FREE. Send no money — just name and address.

PARAKEET BREEDERS ASSN. of AMERICA
Dept. 24, 4353 Lovers Lane, Dallas 25, Texas

CUSHMAN MOTOR SCOOTERS $159.50

Made by Cushman Motor Scooter Co., for the Army Paratroopers, model "53" Airbourne, full size scooter not midget. These surplus scooters have never been used! Just released by the Army. Gov't. cost $454. Weight 255 lbs. 57" wheelbase. 6.00 x 6 tires. Spring mounted leather motorcycle seat. Cushman Huskie one cyl. 4 HP engine. Two speed trans. Built sturdily. Full price $159.50. FOB Hackensack, N. J. Send check or MO with order. Limited quantity—Order now.

Haynes Equipment Co., Inc., 60 Voorhis La., Hackensack, N. J.

BRAND NEW RELEASE

First Time at This Low Price!

T-1 DIVING LUNG

Built to Strict Military & I.C.C. Specifications

$200 VALUE

available with single or double hose ass'y.

89.50

READY TO USE

Also In **SINGLE TANK UNIT**

59.95

Either Unit Complete With All Accessories

COMPLETELY AUTOMATIC

NO CHEMICALS, NO ADJUSTMENTS

Your chance to really save on an exceptional limited offer. A pre-season special!

Mine Safety Appliance Co. *Automatic Demand* Regulator* releases air or oxygen only as needed at a pressure identical to that of surrounding water. Heavy, forged, silver-soldered manifold connects 2 high-pressure tanks (295 cu. in. vol.; 22 cu. ft. press. cap.) fitted with easy acting shut-off valves. Exclusive adjustable steel cradle and harness hold tanks in correct position. A special shut-off valve at mouthpiece prevents water from entering hose. Unit is specially designed to stand upright for filling, testing, and storage.

*NOTE—only those self-contained, shallow-water Diving Lungs equipped with demand type regulator are truly automatic requiring *no* chemicals, *no* underwater manipulation.

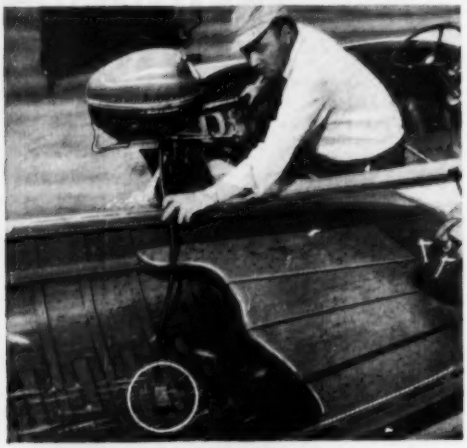
Complete with following accessories: 2" chrome test-gauge and adapter, chrome wrench, canvas tool bag and instruction manual.

Buy now at this special Early-Season Price Offer: 10% deposit holds your purchase. If C.O.D., require 25% deposit. Send check or Money Order.

DIVE-CRAFT, INC. • WILMERDING, PA.

FIRST OUTBOARD THAT

BAILS YOUR BOAT!



SCOTT-ATWATER brings automatic power bailing to outboarding with *Bail-a-matic*, a built-in feature on 5, 7½, 10, 16 HP models at no extra cost! Free booklet tells the whole story. Address Scott-Atwater Mfg. Co., Inc., Minneapolis 13, Minn., Dept. PS-44.

WHEREVER YOU GO

TAKE ALONG THE

Johnson Reel

USE IT ON ANY ROD OF YOUR CHOICE FOR TROUBLE FREE SPINNING CASTING OR FLY FISHING

LIST PRICE $16.50

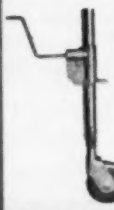
Model 80 with "Carboloy" Pick Up

For you men who know mechanical perfection when you see it. From the moment you make your first cast - you're in for a treat. Beginner or expert, you'll find the NEW Johnson 80 the *one, all purpose* reel. "Nylatron" Drag for smooth action . . . "Change-Easy" Spools for quick line changes . . . true spinning action eliminates line twist.

FREE . . write for folder on Johnson Reels, Model 80, 60, 40a, 20 - all price ranges.

DENISON-JOHNSON SALES CORP., MANKATO 5, MINN.

PICTURED PERFECTION — BULLDOG TRAILER PARKING JACKS!



MODEL 50-P makes hitching or parking trailers an easy, one-man job. Rides flush. Easily installed. $15.37 complete, Fed. Ex. Tax included, F. O. B. Wausau.

Manufacturers of a complete line of trailer axles, couplers and jacks. Write for Brochure 14-D

HAMMER BLOW TOOL COMPANY

"As old as the Industry!"

WAUSAU, WISCONSIN

NEW .25 CAL. **BERETTA BANTAM** FEATHERWEIGHT AUTOMATIC

Featherweight BERETTA BANTAM ... Swell like suede. Chrome finish. Safety ... automatic, improved 9 shot automatic pistol. Fits pocket or purse.

43.50
37.75
37.50
32.00
2.80

FREE GENUINE LEATHER HOLSTER

Order by Mail - Send only $10 - Pay balance on del.

GODFREY IMPORT CORP. DIPT. P-4, 277 B'WAY N Y C 7

FREE CATALOG OF

BOAT KITS

- Assemble your own boat
- No experience necessary
- Save 1/2 to 2/3 "factory built" prices
- Models from 29.25 complete

12 ft. model pictured

Marine hardware & complete accessories

LUGER INDUSTRIES Marine Division 3207 FREMONT AVE. SO. MINNEAPOLIS 8, MINN.

SENTRY SAFES offer you UNTAPPED MARKETS!

EVERY householder, farmer, executive and professional man needs the protection and convenience of a personal safe—yet 19 out of 20 own none. Reach these untapped markets with the big-value SENTRY that all can afford . . . and earn $10,000 a year or more! A SENTRY costs you 35% to 50% less than comparable quality safes. You set your own price, take a king-size mark-up and still undersell all competition. Choice, exclusive territory. Drop shipments if desired. Get full details today.

Write to Dept. PS-4

BRUSH-PUNNETT CO.

545 WEST AVE., ROCHESTER 11, N. Y.

IN PAN-AMERICAN ROAD RACE, "toughest 2,000 miles in the world," thirty leading contenders selected Life-time for their cars, had no trouble, although other cars dropped out due to battery failure. Small stock car winner C. D. Evans said: "most rugged battery I've ever seen."

SCIENCE AND CHEESE CAKE were combined in another test, where Life-time battery was run down completely, then lowered into tank of water and frozen solid. Six weeks later, still in cake of ice, battery was connected to heavy truck motor, started it immediately.

The Battery That Wouldn't Give Up

Run down, baked, frozen, it keeps bouncing back to life. Six-year bonded* guarantee rocks billion dollar industry.

Heralded as the "battery with 753 lives" a new American battery has defied the determined efforts of automotive editors and researchers to make it give up.

Run down, charged, run down and charged from 604 to 1142 times in S.A.E. tests, it keeps coming back for more.

In one test, the Life-time battery beat (by a narrow 24% margin) a famous German battery rumored to be postwar "super battery."

Over 58,000 foot-pounds of power—enough to lift an automobile 15 feet straight up—is developed by the Life-time battery. Tremendous power reserve accounts for battery's performance from 35 below to 160 in the shade.

For cars and trucks, the Life-time battery sells in all 6-volt sizes for $29.95, in 12-volt sizes for $34.95. Special sizes are made for marine and industrial use.

For name of nearest dealer or distributor, write Continental Manufacturing Corporation, Dept. PS-4, Washington Blvd. at Motor Ave., Culver City, Calif.

**Six-year guarantee backed by multi-million-dollar bonding company.*

WANTED: Life-time Battery Distributors, Dealers, Regional Managers

Frankly, we have a problem. Every day, letters and wires pour in asking for the name of the nearest Life-time battery dealer—so many, in fact, that we need more dealers to handle the demand. **These new customers** have seen our full-page advertisements in **Look, True, Argosy, Esquire** and about thirty other magazines. Or they have seen or heard our television and radio broadcasts of international sporting events like the Pan-American Road Race. Now, the same mail brings requests for Life-time battery dealerships.

The answer seems simple: appoint these dealers to take care of our new customers—but it isn't that easy. We need men with executive ability who can qualify as regional managers to help us decide which dealers should be appointed in the fastest-growing organization of its kind in the world. We also need distributors to handle warehousing and administration for our dealer network. If you have organizational ability and are financially responsible, we'd like to hear from you and discuss your opportunities with us.

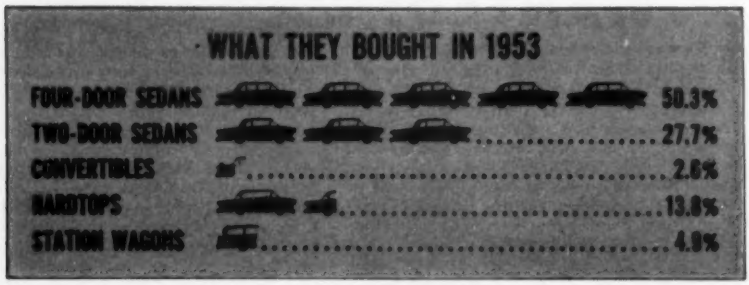
Continental Manufacturing Corporation, Dept. PS-4, Washington Boulevard at Motor Avenue, Culver City, California

POPULAR SCIENCE MONTHLY'S . . . Last minute news & notes

THE ATOM SUB NAUTILUS IS CONTROLLED BY A JOY STICK like the ones used in airplanes. With it, one man can steer and adjust bow and stern for diving, jobs that in other submarines take three men.

BIG-SCREEN COLOR TELEVISION should be available in a few months. RCA has announced development of a 19-inch viewing tube with nearly double the picture area of the 15-incher now in production . . . Blown fuses may harry many pioneer color-TV fans. The first color receivers consume nearly twice as much power as black-and-white sets and may be the last straw for house circuits already heavily burdened with appliances . . . Round rubber bands--they're easier to pick up and sort--are being made by Goodrich. . . . An ultraviolet-ray water purifier for use with private wells has been developed. It operates automatically when connected to the water pipes, is smaller than an electric toaster. A.R.F. Products, Inc., 7627 Lake St., River Forest, Ill., makes it.

THE OLD RELIABLE FOUR-DOOR SEDAN is what more and more people buy, no matter how lovingly they eye the flashy convertibles. Last year's sales figures, just released, show that more than half the cars bought were family sedans (see chart below), up from 42 percent in 1940. The business coupe has almost gone the way of the phaeton--it accounted for only .6 percent of sales in '53 . . . A new torque converter working backwards brakes big trucks going downhill. It gives the wheels "made work" by using a rotor connected to the transmission to pump oil. The driver controls the Allison Torqmatic Brake by varying the flow of oil into the unit.



Lift winter out of your Ford

Winter gives your Ford the severest treatment it gets all year. So with the coming of spring, it's time to have your Ford thoroughly checked and made ready for the pleasant driving months ahead. And if replacements are needed, be sure you

get the parts that are made *right* for Fords—to standards set by the same men who built your Ford—Genuine Ford Parts.

FORD Division of FORD MOTOR COMPANY

Ford Batteries

Long-life Ford batteries are tailored to Ford's ignition requirements and your dealer can recommend the *right* capacity Ford battery for *your* Ford. And every battery carries a liberal warranty.

Ford Spark Plugs

Ford Spark Plugs with unique Sillment seal are designed to "seal in" compression, keep power high. Balanced to your Ford's ignition needs, they give smooth performance, high gas mileage.

Ford Oil Filter Elements

Specially designed filtering material, with millions of tiny pores, screens out harmful contaminants, quickly, thoroughly...yet oil flows freely for proper lubrication; useful additives are retained.

Ford SERVICE

"Trade" where you see these signs

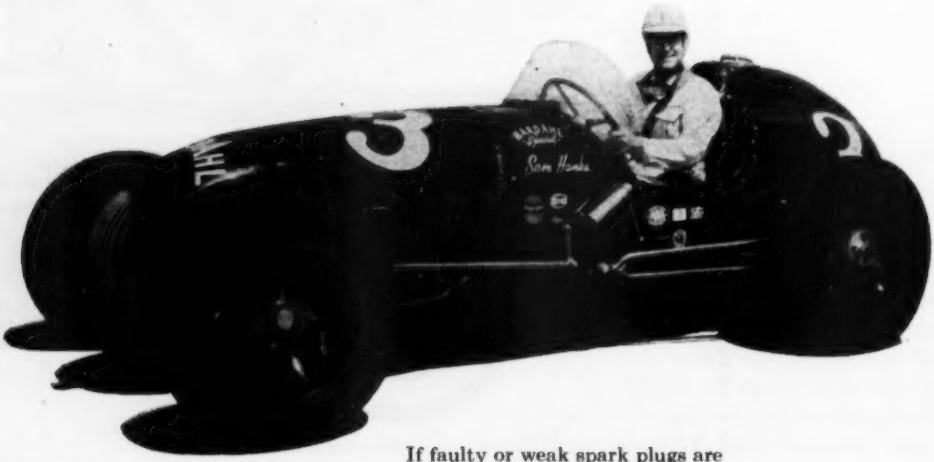
GENUINE Ford PARTS

"Traffic or track . . .

I USE CHAMPION SPARK PLUGS BECAUSE WEAK PLUGS WASTE POWER AND MONEY!"

says Sam Hanks

1953 AAA DRIVING CHAMPION



If faulty or weak spark plugs are robbing *your* car of gasoline economy, then take the sound advice of Sam Hanks—named by the American Automobile Association as 1953's top driver.

"Full-firing Champions' steady spark puts every drop of gasoline to work delivering better car performance and economy. That's why I use Champions exclusively in racing engines and in my family cars. You can depend on Champions to give you *all* the power you're paying for!"

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO

HERE'S WHY YOU NEED CHAMPIONS:

INFERIOR OR WORN-OUT PLUGS waste gasoline by failing to ignite all the gas in the combustion chamber. Unburned gasoline goes out the exhaust.

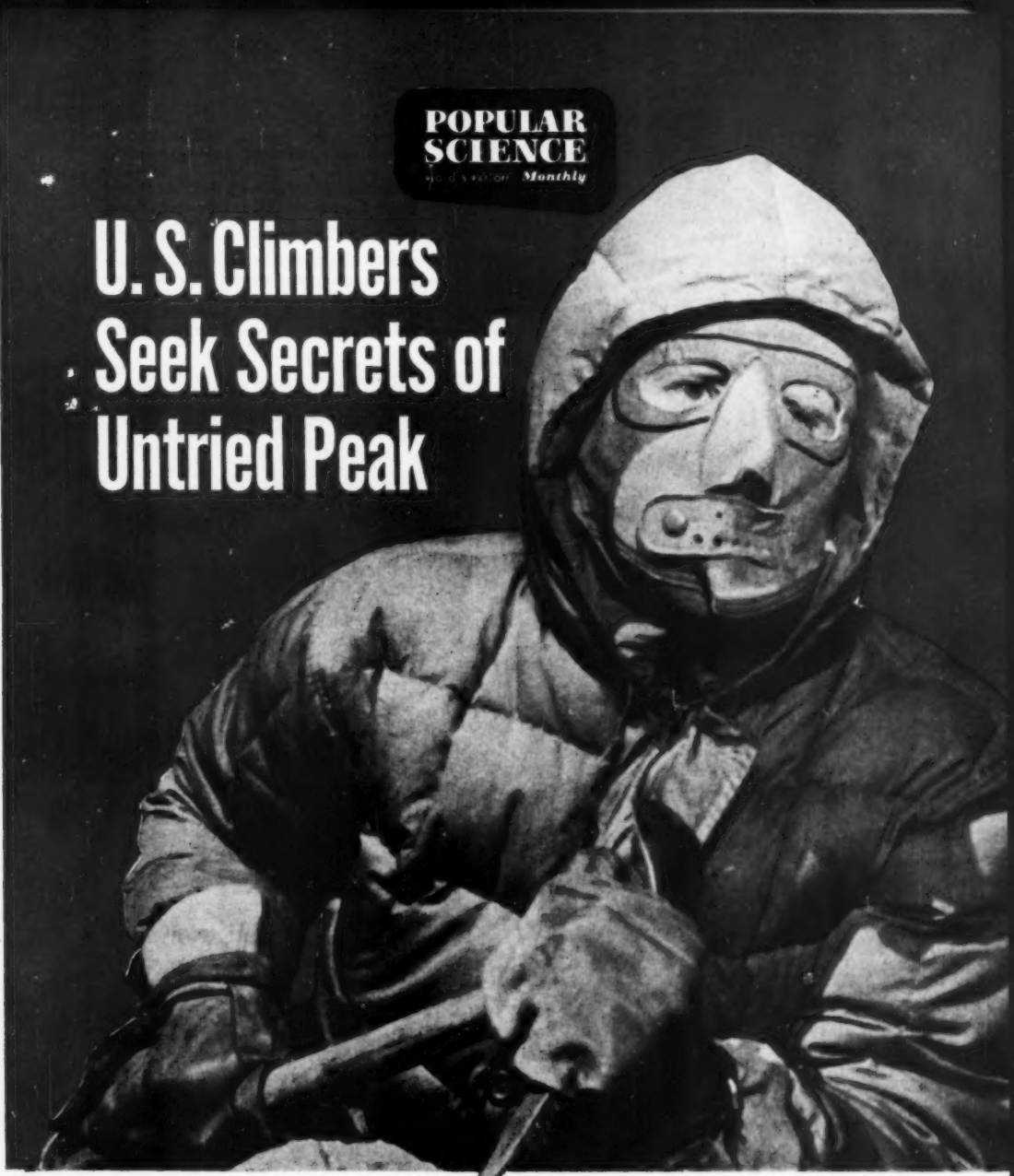
PRECISION-BUILT CHAMPIONS give a full-firing spark which burns all the gasoline in the cylinder and turns it into useful power.

CHAMPIONS

WILL MAKE ANY CAR RUN BETTER

POPULAR SCIENCE
Monthly

U. S. Climbers Seek Secrets of Untried Peak



California scientists assault Everest's giant twin to learn why mountains wear out men.

By Gardner Soule

ATOP Everest, the world's tallest mountain, last May 29, Edmond Hillary and Tensing Norkay looked around them at the pinnacled vista of the Himalayas. "To the east," Hillary recalled later, "was our giant neighbor Makalu, unexplored and unclimbed. I wondered whether a

READY FOR THE BIG TEST on Makalu's terrifying slopes, these four Californians (left) who will make the climb have already trained hard in the Sierras, Andes and on Alaskan and European peaks. Left to right: Fritz Lippman, Alfred Baxter, Richard Houston and Allen Steck.

CUPOLAS ON THE WORLD'S ROOF (below), seen from an airplane, include Everest, Makalu and Chomo Lonzo. The camera faced east-southeast. Tibet is at the far left, Nepal at right.

route up that mountain might not exist."

Makalu, 12 miles from Everest, 27,790 feet tall (only 1,212 feet shorter than Everest itself), is the world's fourth highest mountain.

To see if there is a route up it, 10 men from California are poised at Makalu's base, about to begin the ascent. But the question of a route is only a small mystery compared to the big puzzle the Californians want to solve. They want to find out why the high Himalayas—Everest, Makalu and the others—are so hard on men. They want to learn what really happens inside a man when he is subjected to great stress.

The mountaineer on the upper slopes of Everest, says Eric Shipton, the great British Himalayan explorer, is "like a sick man climbing in a dream." At the peak of Everest, Hillary was only slightly tired; by the time he reached the first advanced camp, coming down, he was utterly exhausted.

This desperate fatigue is only one of the results of severe emotional and physiological stress. Mountaineers report many other results: headaches, nausea, loss of memory, loss of temper, loss of appetite, enlargement of the heart, gasping for breath. These are caused by body changes that take place under conditions of physical hardship and mental strain. Little is known about the specific physiological changes involved; through study of these, it is hoped that the mechanism of stress itself will be better understood.

Tests on the Top of the World

Filling this gap in scientific knowledge is the great objective of the expedition to Makalu. The leader, William E. Siri, 33, is a medical physicist. Dr. Nello Pace, 37, oldest man in the party and an associate professor of physiology at the University of California, is senior scientist of the expedition, in charge of the research on stress.

Throughout the climb, Siri and Pace will be hard at work: measuring the white-blood-cell count and the eosinophile (another blood cell) count of men on the expedition; taking blood smears for study; analyzing samples of blood for urea, nitrogen, sodium and potassium; making gravity, sodium and potassium determinations of urine specimens; measuring the adrenal-cortical reserve—the amount of hormone still available to the body after stress; and measuring certain sterols (body alcohols) eliminated in the urine.

Other frequent tests made upon climbers will include red-blood-cell counts, tests of hemoglobin concentration, checks on the rate of breathing, and counts of pulse rates of men at rest and after simple exercise.

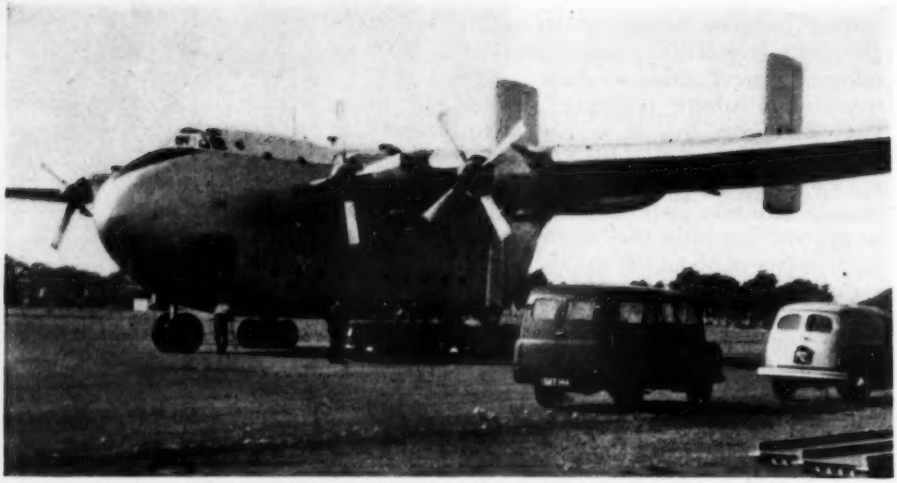
Men can be placed under stress in many ways besides high mountaineering: a death in the family, a business failure,

[*Continued on page 266*]

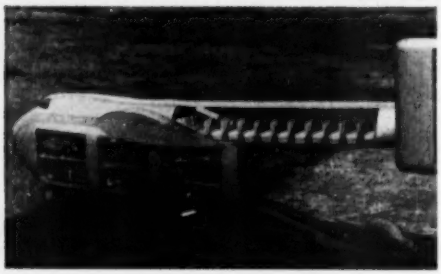
CRAMPONS TO BITE INTO ICE or packed snow are fitted over boots by Fritz Lippman of the Makalu expedition. The climbers fear bare rock, which would offer riskier footholds.

ORDEAL BY HEAT in the steamy Arun River valley, infested with malaria and giant hornets said to inflict fatal stings, had to be endured before the climbing even began.

ORDEAL BY FATIGUE—its cruel drag on Everest conquerors Hillary and Tensing evident in photo below, taken near the top of their climb—awaits Makalu expedition.



Three-Deck Aerial Auto Ferry Now Hops English Channel

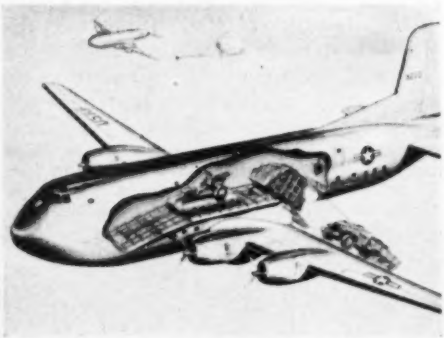


A LONDON passenger and his car are now only 85 minutes away from Paris. A 42-ton, four-engine Blackburn Beverley freighter of the Silver City Airways regularly ferries 42 passengers and six automobiles across the English Channel at more than 175 miles an hour.

The cars are loaded onto a double cargo deck through the rear of the plane's fuselage (see model at left). An electric elevator lifts three of the cars to the upper deck.

Fast Copter Carries Jeeps

THE Marines' new helicopter can stow three Jeeps in its fat fuselage. Two engines, encased in teardrop compartments, give the Sikorsky XHR2S a speed of 150 miles an hour—fast for a whirlybird. Retractable landing gear lends the big aircraft a streamlined look in flight. It can carry 26 men, fully combat-equipped.



Plane Drops Big Stuff Pronto

PARACHUTE delivery of a field piece, several hundred rounds of ammo and a truck takes no time at all with a new system installed in an Air Force Douglas C-124 cargo plane. Each unit is lashed to a pallet, on tracks and hooked to a chain drive. At the touch of a switch, 40,000 pounds of cargo can be dumped in a few seconds.

Jet Assist Gives Navy Patrol Plane Extra Kick in the Clinches

IF THE Navy's Neptune patrol plane has to get out of a tight combat spot in a hurry, its two piston engines now have the help of two jet units hung in pods under the wings. The twin jets produce 6,800 pounds of thrust, enough power to fly the Lockheed plane alone. The jets also help in take-offs from short runways.

Turboprops Add Speed, Range

WITH four turboprop engines, the newest of the Air Force's Globemaster series of transports, the Douglas YC-124B, can fly faster, farther and higher than ever. The 5,500-horsepower engines enable the huge 100-ton plane to carry 200 soldiers.

Lightplane Has Wing-Tip Tanks

FUEL is carried in teardrop wing-tip tanks in this new five-place Cessna 310 private plane. Among the advantages claimed for the arrangement is that, with the gasoline away from the cabin, it is less of a fire hazard for the passengers.

Rotor Blades Lift, Prop Speeds First Military Convertiplane

CONVERTIPLANE means an aircraft that takes off and lands vertically like a helicopter, then, on reaching altitude, converts in flight to a more efficient form of propulsion for faster forward flight—in this case a rear-mounted propeller, with stub wings to provide lift.

The McDonnell XV-1 has a piston engine mounted at the rear of the fuselage. For helicopter take-off and descent, the engine supplies air to pressure-jet units at the tips of the rotor blades; during forward flight it powers the propeller.

Developed for the Air Force, the experimental XV-1 is expected to make its first flight this summer.

Steel body under a removable plastic hardtop is used on the Thunderbird. Car is very low; top of door is only 33.7 inches from ground, though road clearance is 5.5 inches, only slightly less than that of other Fords. Steering column has telescopic adjustment with 3-in. range.

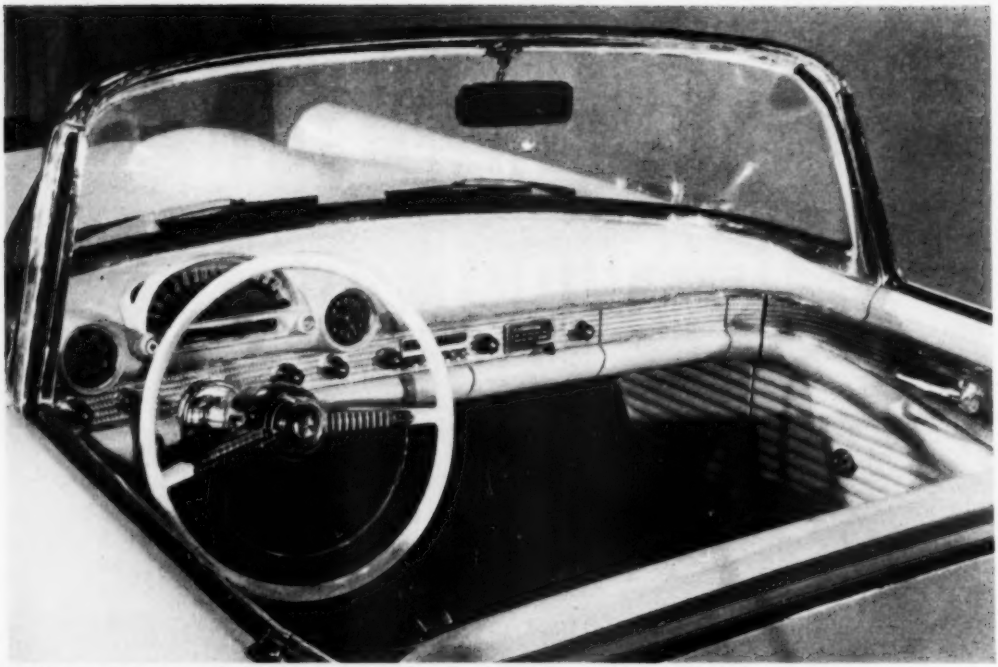
Beneath that hood is a 160-hp. OHV V-8 power plant. Engine has displacement of 256 cu. in., same size as the current Mercury. But Ford engineers assert solemnly that it is not a Mercury mill. Those rear bumper-guard spinners in photo below terminate the twin tailpipes.

Swanky New Ford Is Sweet and Low

This 160-hp. sports car is intended to be fun to drive. No dream job, it will be built for sale.

VISITORS to Ford's Dearborn test track have been seeing small blurs streaking around the high-speed oval. Watching one of them flash into the straight will remind even the tamest sedan pilot that on some cars the gas pedal can accurately be called the "exhilarator."

The blurs have been test versions of the Ford Thunderbird, a 2,833-pound, 160-horsepower sports car. Not just a designer's dream for auto-show custom-



THAT'S A TACH at the left of the panel. The stick shift on the floor works a manual three-speed box. If you insist, you can have a Fordomatic drive, with a floor range selector.

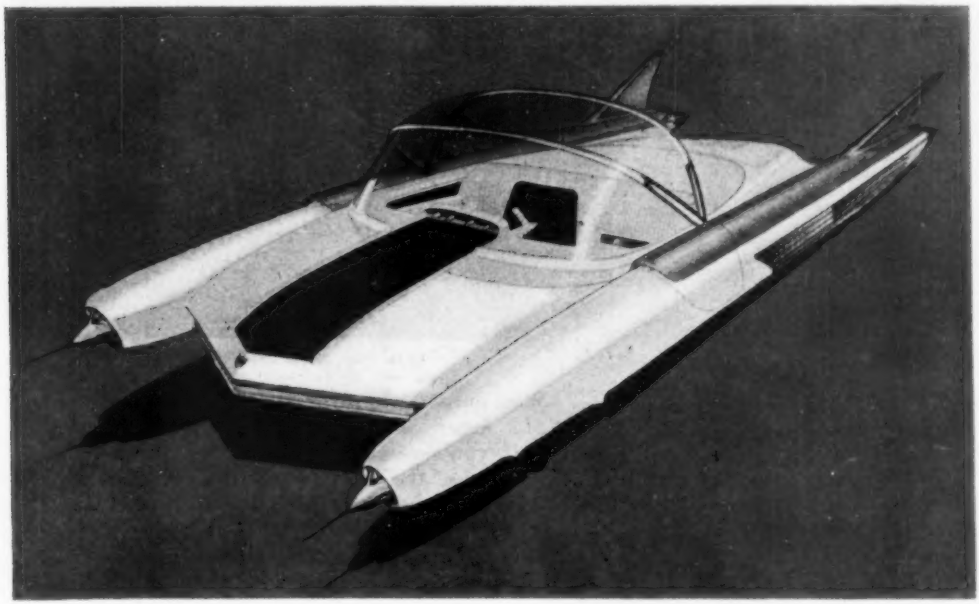
ers to goggle at, Thunderbird is a roadable car that will be produced in sizable quantity this fall. Ford executives are cagey on price, but Detroit rumors set it just above $3,000—a few hundred below the tag on the Chevrolet Corvette.

The Thunderbird, in development for several years, puts Ford squarely in the prestige trade of building high-performance but medium-priced "personal" cars. Long dominated by imports, the field has lately had such lively entries as the Kaiser-Darrin and the Corvette. All three are short-wheelbase jobs—102 inches for the Thunderbird and Corvette, 104 for the K-D. Each is extremely low, and each is a two-seater. Pounds per horsepower, the "jump" index, figure out at 17.7 for the Thunderbird, 19 for the Corvette, and 23.8 for K-D. Ford engineers say that if you stage a drag race between Thunderbird and a stock OHV '54 Ford V-8—no slouch—the new car will pile up a lead of 53 car lengths in 40 seconds.—*Frank Rowsome Jr.*

Ford's "Atmos" —or How Dreamy Can They Get?

THAT spooky craft at the right is the Ford "Atmos," a show car recently unveiled to bug the eyes of the public. Among its wonders are hand-grip steering, a "Roadarscope" in the dash to tell you what's ahead, and an automatic pilot. This last dingus takes over steering, responding to metal plates that may someday be installed in roads, "permitting the driver to play bridge between cities." Also envisioned are power-operated doors —no need to slam them by hand—and a microphone to allow a driver cocooned inside the sealed, air-conditioned egg to ask directions of people in the harsh world outside.

REMOVABLE HARDTOP is warm and weather-tight, lifts off easily for storage in your garage. If rain catches you away from home, there's a regular cloth top in the deck.



Wilbur Shaw Drives America's Newest Car

Economy-Size Nash Is Fast and Fancy

By Wilbur Shaw
President, Indianapolis Motor Speedway

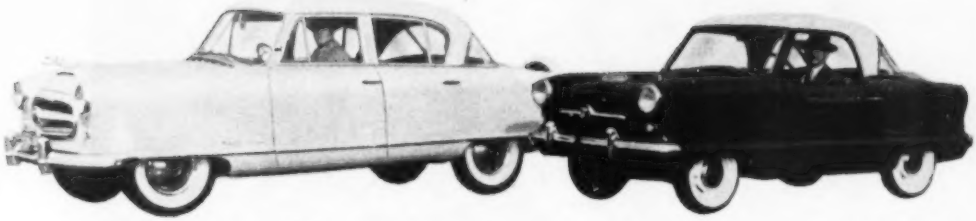
BEEN looking for a way to save gas—lots of it?

Been looking for a snug little car that you could jig through traffic with a toe and a finger and ease down the turnpike at 65 m.p.h.?

Been itching for the flair of a European automobile without giving up good old American comfort and flexibility?

If you're nodding "yes" to all these questions, the car for you may be a new 42-horsepower fireball called the Nash Metropolitan. I found this economy-size package as solid as a little tank and scatty as a racer.

Beside the Metropolitan, even Nash's



Rambler's baby brother can run like 60, or even better, consumes gasoline sparingly, and cuts a pretty figure.

A THOROUGHBRED from any standpoint, this new member of the under-one-ton class of cars is nevertheless a hybrid. Designed by Nash in the U.S., it is being built in England by Austin and Fisher-Ludlow.

junior-league Rambler looks big, as you can see at the top of this page. The Rambler is, in fact, as much as 865 pounds heavier and 3½ feet longer, depending on which models you compare.

The Metropolitan, which weighs less than a ton and is just short of 12½ feet long, demands attention from the moment you shut its doors. That good, solid *chunk* of metal on metal says sound body construction. Close your eyes, and this could be the biggest car on the road.

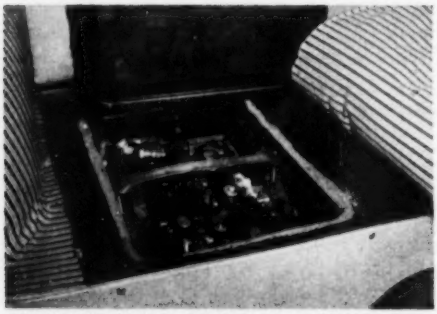
Packs Punch on the Starting Line

The body styling shows Pinin Farina's fine Italian influence, although it was done by Nash designers. A surprising feature is the high roof line, only half an inch lower than that of most big cars.

The Metropolitan comes in two models—a hardtop and a convertible. I drove the former, a dark-green-and-gray beauty. It started almost soundlessly, punched my two passengers and me back in our seats when I gave it gas, and turned on its tail when I spun the wheel. It has many sports-car character-

INSTRUMENTS are standard, though there is no water-temperature gauge. Heating-ventilating system is scaled-down standard Nash equipment. Radio, turn signals, lighter and wipers are factory-installed.

Chained-down oil-filler cap that can't be misplaced is typical of refined touches on this car.



UNDER THE PADDED BACK SEAT and beneath an access plate lies a 12-volt battery. This has long been standard equipment supplied in cars that are manufactured in England, but I was somewhat surprised to find one installed in a small American automobile—and a four-cylinder job, at that.

istics. You get that cockpit feel because of the car's modest size, but, in addition, steering is tight and responsive, and there is a sensitive sureness when you run through the gears. Like the Rambler, the Metropolitan is shifted by a post lever working through a ball-and-socket on the dash.

There seems to be jazz aplenty in this little car. It did 75 m.p.h. in the test runs of the National Association of Stock Car Racing on the Raleigh, N.C., Speedway last winter. Nash engineers told me that they have found that it tops 70 m.p.h. easily.

I didn't attempt anything like that on Chicago's streets, which is primarily

FACTS ON '54 NASH METROPOLITAN

Model: Hardtop coupe.

Engine: 4-cyl. OHV; 42 hp. at 4,500 r.p.m.; compression ratio, 7.2:1; piston displacement, 73.17 cu. in.; bore and stroke 2 37/64" by 3¾"; torque, 62 lb.-ft. at 2,400 r.p.m.

Weight: 1,825 lb.; per hp., 43.5 lb.

Transmission: 3-speed manual synchromesh; rear-axle ratio, 4.625:1.

Steering ratio: 21:1.

Springs: front, coil; rear, semi-elliptic.

Outside dimensions: height, 54½"; overall length with bumpers and guards, 149½"; width, 61½"; wheelbase, 85"; overhang, front 28¾", rear 36¾"; tread, front 45 5/16", rear 44 13/16".

Inside dimensions: seat-cushion width, 49¾"; leg room, front 49¾"; headroom, 35½"; seat height, 10"; vertical distance, steering wheel to seat cushion, with the seat in mid-position, 6¾"; front-seat adjustment, horizontal, 4".

Tire size: 5.20 by 13.

where I tried out the Metropolitan, but I did 60 on a deserted roadway. And there was still plenty of room between my right foot and the floor.

The car gives astoundingly good gasoline mileage, too, though it may not be as good as the 41 miles to a gallon chalked up in the Raleigh tests. That is an "open-highway" figure. But even city driving will be plenty economical.

Extra Seat Takes Adult or Children

Remember that I said three of us were in the car I tested. Behind the two standard, upholstered front seats is a padded bench seat. It is big enough for an adult on short trips and ample for one or two children on longer runs.

We rolled over plenty of rough spots on the workout I gave the Metropolitan, but the little car did well. Nash's independent front coils smooth things out nicely on all their cars, but in this one they've remounted the springs between wheels and body. Each spring is out nearer the wheel, lodged between the upper control arm and the body structure. This makes for faster-triggered and more positive spring action. Combined with the smoothness of the car's Hotchkiss drive, it makes for an unexpectedly easy ride.

I didn't notice any low spots in performance, but this is one of the cars you have to shift and drive if you want to avoid mushy behavior.

A modified version of an English four-cylinder, overhead-valve engine, the Austin A-40, runs the Metropolitan. The Nash modification has four piston rings instead of three, and the latest British (not American) Zenith downdraft carburetor. Compression ratio is 7.2:1. Head and block are cast iron. The pistons are aluminum.

Both for protection and handy access, steering-linkage tie rods run above and behind the wheels through the engine compartment.

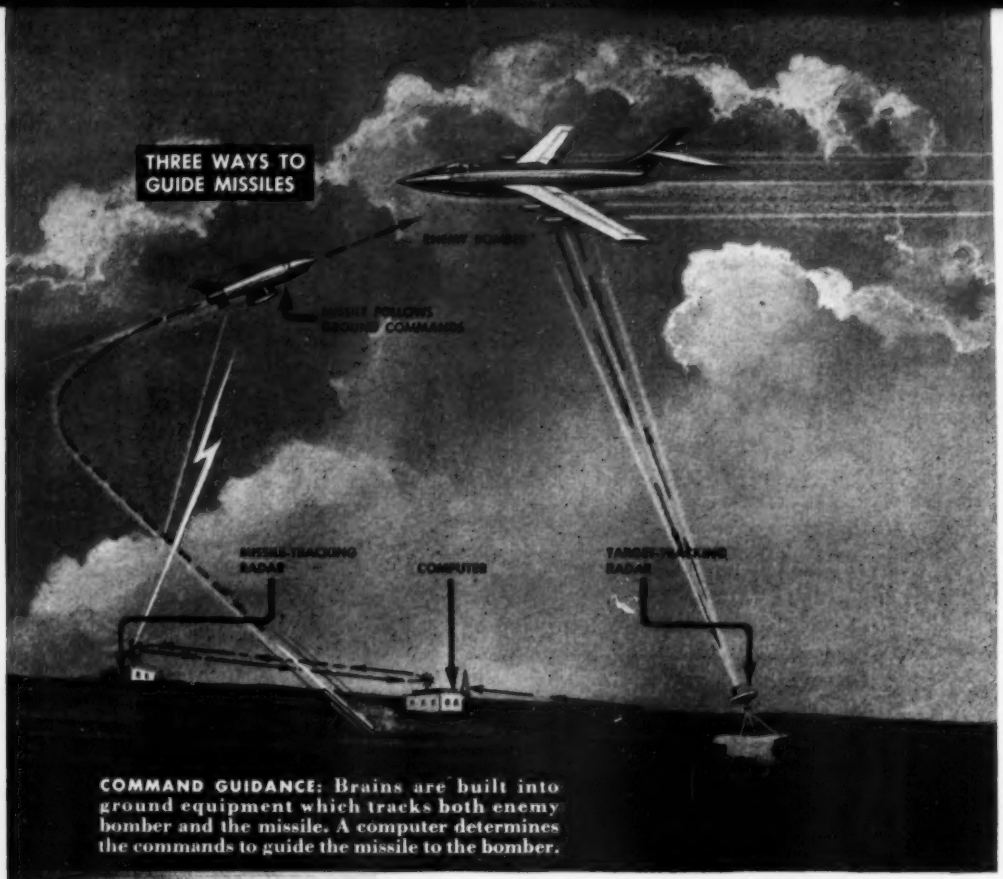
You get pleasant surprises tinkering with this car, too—like a hand pump on the mechanical fuel pump to suck up

[*Continued on page 270*]

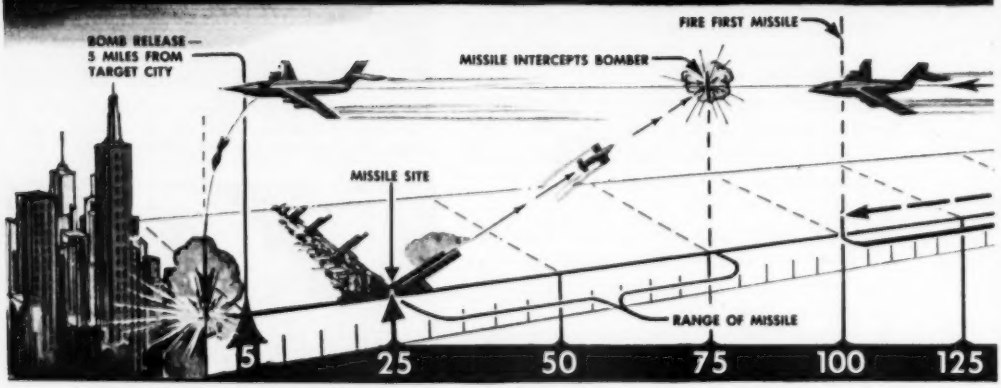
FAMILIAR NASH FEATURE is the continental spare, which tips back for removal. The luggage compartment doesn't open from outside.

TURN A TUMBLER LOCK in the back of the rear seat and the panel folds down, opening up a roomy compartment for suitcases.

JACKING IS AN EASY JOB, done with a unique, triangular screw jack that fits into a special bracket midway on either side of the car.

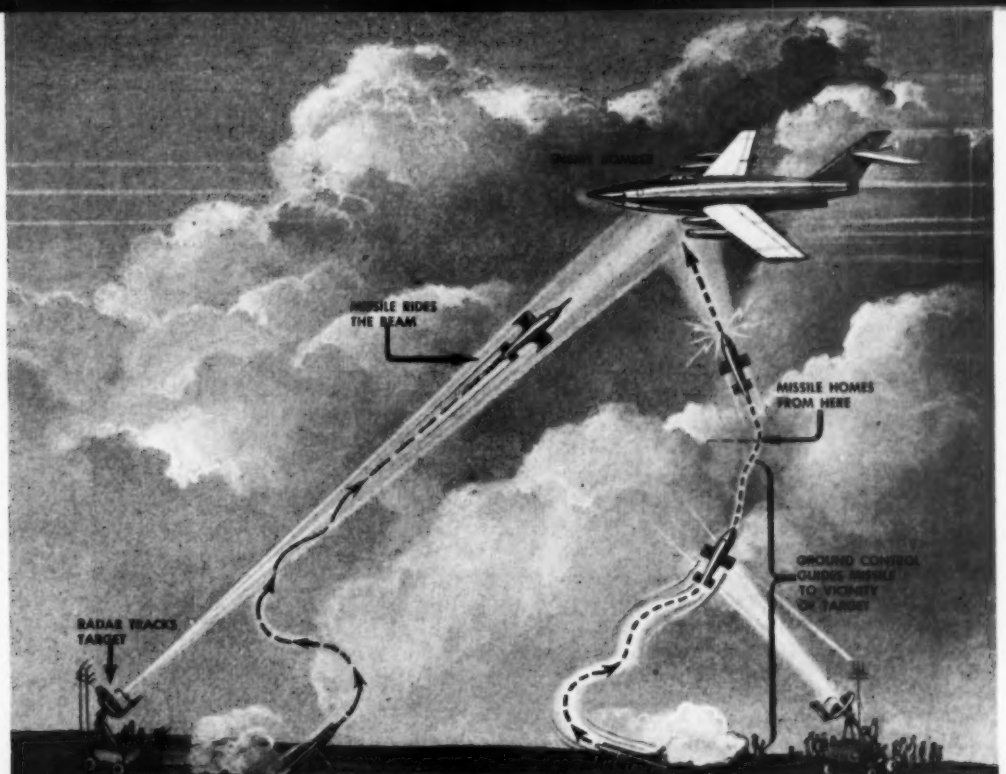


COMMAND GUIDANCE: Brains are built into ground equipment which tracks both enemy bomber and the missile. A computer determines the commands to guide the missile to the bomber.



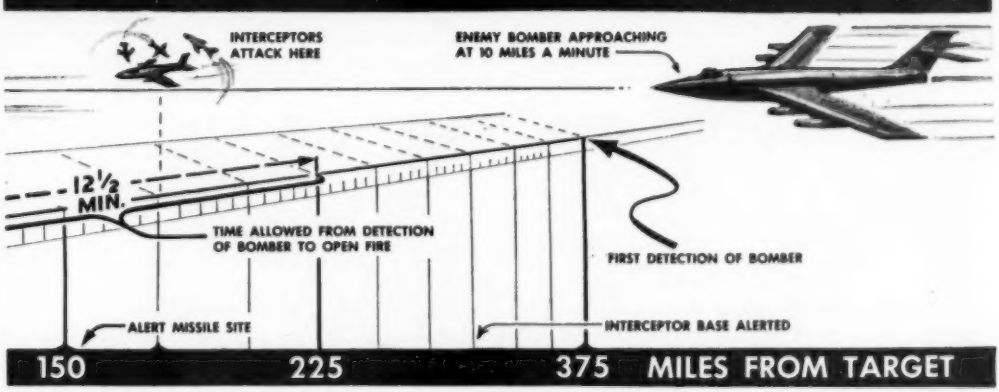
How Missiles Would Defend Our Cities

SUPPOSE you were to defend a city against 600-mile-an-hour bombers with 1,200-mile-an-hour guided missiles. It's complex, as shown in the drawing above, based on a lecture by Henry H. Porter of Johns Hopkins. Since the missiles, launched from a site 25 miles outside city, have a 50-mile range, the first one should intercept the attacker at a point 75 miles out. But since the bomber will have flown 25



BEAM RIDER: Brains are divided between ground equipment and the missile. Ground radar tracks the bomber, and the missile gets on the radar beam and rides it.

HOMING GUIDANCE: Brains are built into the target-seeking missile. Ground equipment guides the missile to the general vicinity of the bomber. From there the missile homes on its own.



miles while the missile has sped 50, the missile must be fired while the attacking plane is 100 miles from the target city.

The missile site needs five minutes to get ready, however, so it should be alerted when the bomber, coming at 10 miles a minute, is 150 miles out. But before that can be done, an additional 7½ minutes must be allowed for identification and tracking of the enemy bomber—which means that it should be detected when it is 225 miles away.

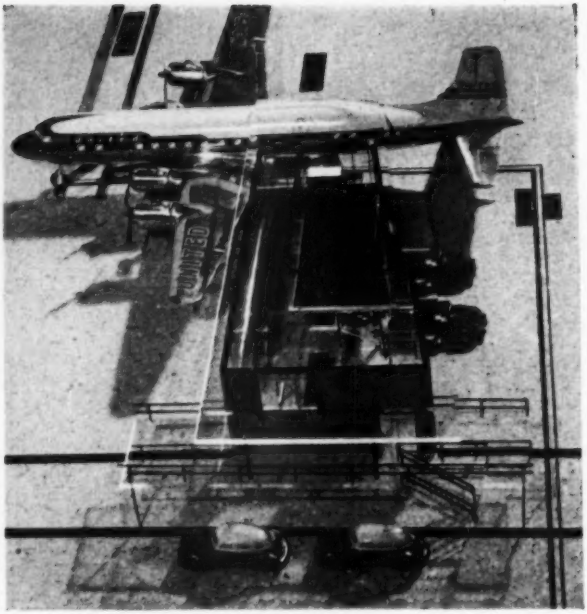
Now, if we want to get some of our jet interceptors upstairs, they should attack beyond missile range. Allowing 10 minutes for this air battle, the interceptors would engage the enemy 175 miles out. But jets need 20 minutes to get into the air, and for early warning. Thus, the attacking bomber must be detected a minimum of 375 miles from the city. END

Novel Airdock to Unsnarl Traffic

A TWO-STORY airdock for loading and unloading airplane passengers, baggage and cargo with a maximum of speed and efficiency has been built at Denver by United Air Lines. A plastic "see-through" model of it is shown at the right.

The airdock abuts each arriving or departing plane, moved into place by a special rig. Mail, cargo and luggage are received on the ground floor and moved from there into the plane on conveyor belts. This routine is reversed for incoming flights.

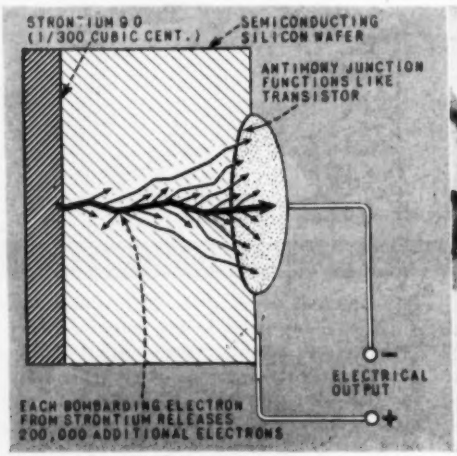
Passengers step straight into planes from the airdock's second floor, without being exposed to the elements.



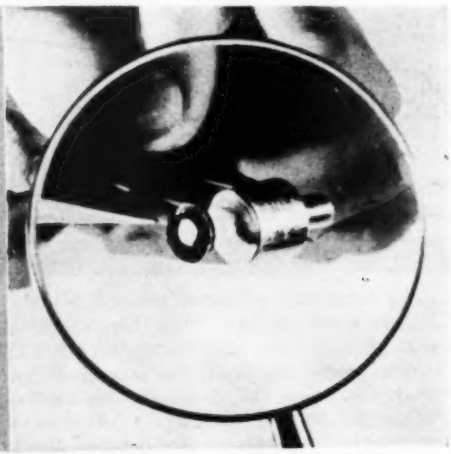
Bean-Size Battery Converts Atomic Energy to Electricity

TINY herald of a future day when your radio, lamps and even your refrigerator may have built-in power is an atomic battery that was recently announced. Developed by RCA, the experimental battery produces only a millionth of a watt of current, but its promise lies in the fact that it directly converts nuclear energy into electricity in a more efficient way than any discovered before. It multiplies by 200,000 the energy from a practically invisible amount of radioactive strontium.

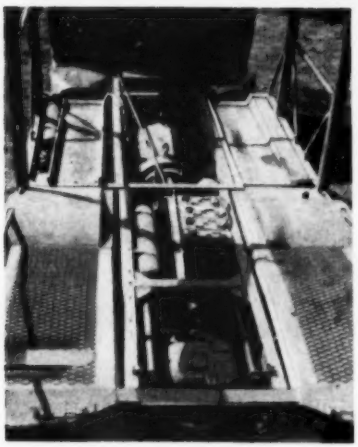
Earliest practical uses are expected to be in hearing aids and pocket radios.



HOW THE ATOMIC BATTERY WORKS is shown simply in this drawing. Electrons released in the wafer of semiconducting material build up voltage as they flow across the junction.



BASIC ELEMENTS of the battery are best seen under a magnifying glass. The cylinder at right above has a thin radioactive coat. At left is silicon wafer with dot of antimony.

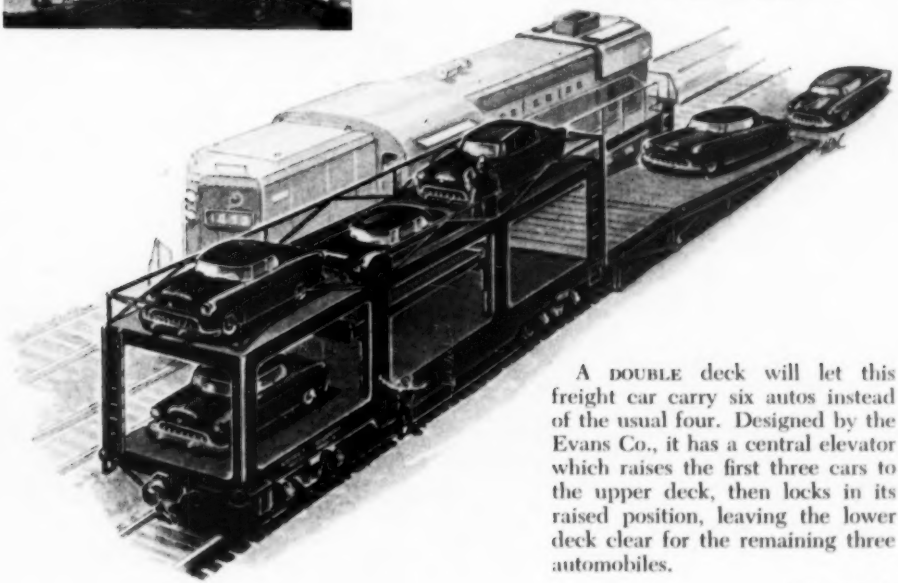


Seven Cars Hitch Ride on Highway

SEVEN cars ride piggyback on this diesel-powered carrier. Its Cummins pancake engine is inset in the truck bed, as shown at left, with two radiators angled behind the front wheels to cool it. The rig makes 3½ round trips a week between a California assembly plant and dealers in the Portland, Ore., area. Two drivers, alternating at the steering wheel and a sleeping berth in the cab, push the truck and trailer a distance of 19,800 miles a month at a maximum speed of 45 miles an hour.

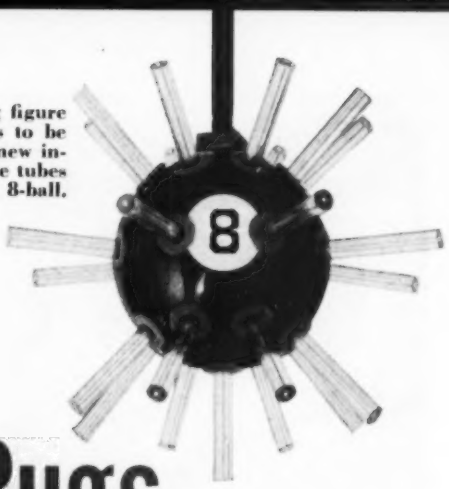
The Convoy Co., Portland, built the automobile carrier in their own shops.

Six Cars Ride Upper and Lower Berths on Rails



A DOUBLE deck will let this freight car carry six autos instead of the usual four. Designed by the Evans Co., it has a central elevator which raises the first three cars to the upper deck, then locks in its raised position, leaving the lower deck clear for the remaining three automobiles.

A GRIM TOUCH OF HUMOR was that of painting figure 8s on the ball-like clusters of capillary tubes to be hung in trees being test-sprayed with vicious new insecticides. Amount of fluid that collects in the tubes shows how much spray is hitting bugs near 8-ball.



Nerve Gas Now Kills Bugs

Insect enemies are paralyzed as they feast on leaves that have absorbed poisons related to dreaded war weapon.

By Andrew R. Boone

FIRST cousins of the dread nerve gases that the Germans made in 100-ton lots during World War II but never used are now paralyzing and killing millions of our insect enemies.

Last year, one of the deadly new insecticides—the chief ones are named OMPA and Systox—routed the pests from more than 100,000 acres of cotton in Arizona and California. This year, the latest phase of the ancient war with bugs, which do around $4,000,000,000 worth of damage in the U. S. each year, is being greatly expanded. Planes are dusting crops with the lethal liquids, called systemics, in many parts of the West and South.

What makes OMPA and Systox such effective killers is that the plants on which they fall take the poisons right into their systems. Afterwards, for many weeks, any bug that feasts on the plants is a goner. The plants themselves are not hurt a bit.

The key to this insidious mode of attacking insects was found one crisp fall morning in 1951 by Dr. Lee R. Jeppson of the University of California at Riverside. From his cluttered office in the Citrus Experiment Station, Dr. Jeppson carried a small bottle of sticky

MASKED MEN, also wearing protective clothing lest the paralyzing bug killer harm them too, lay down a barrage in a California orchard.

A NIGHT GAS ATTACK, gaining by quiet air, strikes the insects in an orange grove.

PROOF OF THE PERIL to bugs that feed on plants sprayed with nerve gas, the leaf photos above show, by means of a radioactive tracer, how thoroughly the poison spreads through a plant. At the top, scientists follow a tracer with their Geiger counter.

brown fluid and a paintbrush into the nearby lemon orchard. He selected a tree that was heavily infested with two kinds of mites and painted a band 18 inches wide around its trunk.

Six days later, Dr. Jeppson picked a hatful of lemons from that tree and brought them into his lab, where he turned them over and over in a hunt for insects. To his great surprise, there weren't any.

By his simple experiment, the scientist had made two important discoveries. He had proved that bark, contrary to common belief at the time, is absorbent, somewhat like human skin. The lemon tree had taken in a powerful insecticide through its bark, and the poison had traveled through the tree's sap stream to the leaves, blossoms and fruit. More, the poison had reached even the fruit in sufficient strength to kill sucking insects that fed on it.

These discoveries made possible a whole new strategy of insect warfare. They indicated that plants could imbibe poisons without harming themselves but with mortal danger to their foes.

Systemics Kill Underneath, Too

OMPA and Systox also solve another problem that previously perplexed crop growers and entomologists—how to get at bugs on the undersides of leaves. These amazing insecticides land largely on the upper surfaces, like other bug killers, but because they quickly enter the very life stream of the leaves, they soon doom insects nibbling at the bottom sides, too. Moreover, unlike most sprays, which kill for only a few weeks, the systemics pack a paralyzing punch for as long as four months.

Both man-destroying nerve gases and bug-destroying systemics come from a common organic phosphate ester, called diethyl fluorophosphate (DEFP). As long ago as 1936, German scientists found that this compound would kill animals.

From their original DEFP base, the German researchers branched in two directions. One route led to a group of phosphates (war gases), the other to a group of thiophosphates (insecticides).

The war gases and the insecticides kill by similar biochemical reactions. The former blind and choke humans, cause tremors and violent convulsions, stimulate nerve endings and leave water and mucus in the lungs. Death usually follows.

Insects do not have lungs, but the insecticides go for their nerve systems, paralyzing the life out of them.

Experts from the University of California followed up Dr. Jeppson's initial discoveries with many tests of ways to

apply the systemics. Obviously they could not go around painting cotton plants and sugar beets, though for a highly localized infection a brush is as effective as a team of four men with a $5,000 spray rig. They sprayed crops with OMPA and Systox from planes and hand pumps. They pumped the insecticides under high pressure into trees, using oscillating nozzles to make sure that they reached the innermost leaves and fruit. They soaked seeds in the systemics before planting them. Field trials showed that the poisons reached their marks even when applied to the soil surrounding plants. The plants proceeded to absorb it through their roots.

Cotton was the first important guinea pig on which the systemics were tried in the U. S. Two years ago, four ounces per acre of Systox, mixed with water, virtually wiped out the mites and aphids in one large cotton field in the Imperial Valley. The patch remained free of insects for weeks.

The UC entomologists are now trying other compounds, in an effort to knock out the pin bollworm and the boll weevil.

Although their main object is to protect California agriculture, the experimenters anticipate that their work will result in spreading a protective mantle over nearly all U. S. crops, including those from the rival groves of Florida.

Safe for Humans

You need not worry about being poisoned yourself. The systemics will not even make you burp. Not enough of them will remain in the fruit or food to cause any ill effects. Even a large dose will do no harm, for the body does not store these compounds.

How soon will you be able to eat and serve food that has been protected by the new insect killers? As soon as the Pure Food and Drug Administration and your own state give the nod. Right now, cotton is the only crop that may be treated legally. Within another year or two, though, UC scientists believe edible crops will also be getting the "nerve gas" treatment. END

Cleaner Stretches Its Neck

THE unfamiliar apparatus above is a new Swedish vacuum cleaner being used to tidy up an apartment building. An extensible light-metal tube carries the suction source up the outside of the building. The man who is doing the actual cleaning taps the tube at whatever floor he's on.

Yankee Ingenuity Adds New Touch to Old-World Styling

THIS spare-tire mount (left), gives a Plymouth a continental look, yet makes access to the trunk easy. Its spring-loaded arm swings off to one side when released by the driver.

When dropped back into place, the wheel nestles low, giving a sleek appearance and adding eight inches to the car's length. An optional conversion, the mount is installed at the factory.

Propeller Drives Argentine Racer

WITH a propeller at the rear to add push to the engine's pull, the Aerocar at right is claimed to have boosted its speed to 154 m.p.h. The car was built by the Argentine Institute of Aeronautics and Mechanics. Reinhard Horten, one of the inventors of the German V-1 bomb, designed it.

Mercury Shows Low Hardtop

THOUGH currently a one-of-a-kind show car, this XM-800 Mercury Monterey could be placed in volume production, according to Benson Ford. A four-passenger hardtop coupe, it is mounted on a 119-inch wheelbase and is only 55.6 inches high, lower than any U.S. hardtop in present production. Road clearance is seven inches.

Teardrop Car Cuts the Wind

THIS striking B.A.T. 5—a special Bertone body on an Alfa Romeo chassis—is owned by S. H. Arnolt of Chicago. Headlights retract into cooling-duct walls and special skirting minimizes air turbulence at the wheels. Those curved, slotted back fins are to feed air to the drag-inducing "bubble" of low pressure that trails a speeding car.

"Lowest-Priced Car" Arrives from Britain

A MITE of an auto from Coventry, England, has landed in the U.S. to challenge all native contenders for the title of "lowest-priced car in America." The new Vanguard Cadet, a four-cylinder, four-door sedan, costs $1,387 at ports of entry.

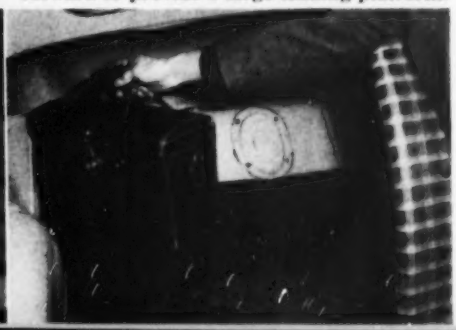
It is an impressive little performer. Its overhead-valve engine develops only 26 horsepower but whisks the 11-foot 10-inch Cadet over the highways at up to 60 miles an hour. The car, easy to park and turn, averages better than 37 miles to the gallon of gasoline. It has electric windshield wipers, hydraulic brakes and clutch.

AN AUSTERE DASH groups the instruments in a five-inch dial directly in front of the driver. The parcel shelf could hold a radio.

THE COMPACT ENGINE has a compression ratio of 7.25:1. The car has four forward speeds, and the shift lever is right over the gearbox.

THE SPARE'S IN A SLOT, behind a cover that comes off completely. Cadet's strong, light body and chassis are of unitized construction.

STOWAGE SPACE for luggage is a metal cave behind the rear seats. The seat backs fold forward to provide a large loading platform.



What Would

GRANDMA would probably fling up her hands—and that, of course, would trip the magnetic cabinets that slide down on tracks—if she found herself in the kitchen pictured below. If, in her excitement, she also touched some of the dozens of push buttons, doors would fly open, appliances would pop up from nowhere, and foods would come cascading out of neatly hidden dispensers.

It's General Motors' new dream kitchen, part of the Motorama's traveling entourage of motorized miracles.

In many ways, though, Grandma would feel right at home. Back is her old-time flour hopper, though now with a motorized sifter. Back, too, is her famous spice shelf, motor-driven of course. The idea, says GM, is not to cook the food for you, but to make it easier for

Grandma Say?

you to cook your own food better. In fact, modern housewives are expected to have their hands full—hence, elbow-operated door catches.

When can you buy such a kitchen? Built-in refrigerators and freezers are already on the way, and home-size electronic ovens may not be far off. Mostly, it's a matter of fitting today's wonders to tomorrow's pocketbooks.

...if her kitchen had:

1 *A three-way ice maker to dispense cubes, crushed ice or ice water.*

2 *A serving counter to dining room.*

3 *Cabinets that open from either side.*

4 *An electric mixer that rises out of counter.*

5 *A magnetically held seasoning rack that drops down for use.*

6 *A food blender that rises out of counter.*

7 *A viewing screen to show menus.*

8 *An electronic oven that retracts into counter, cooks food in a few minutes.*

9 *A flour dispenser with a powered sifter.*

10 *A combination Dutch oven and griddle.*

11 *A deep-well cooker built into range.*

12 *A food warmer that keeps meals hot.*

13 *An automatic built-in toaster.*

14 *Clock timers that turn cooking units on and off for pre-set intervals.*

15 *Motorized cabinets that rise and lower.*

16 *An automatic dishwasher in the sink.*

17 *An electric oven that retracts into counter, with a broiler, motor-driven rotisserie, charcolator that passes hickory or charcoal smoke over food.*

18 *The sink in middle of room.*

19 *A motor-driven chopping board that rises to any height for working while standing or sitting.*

20 *An automatic garbage disposer in the sink.*

21 *A faucet that sets both amount and temperature of water.*

22 *A waist-high refrigerator built into wall.*

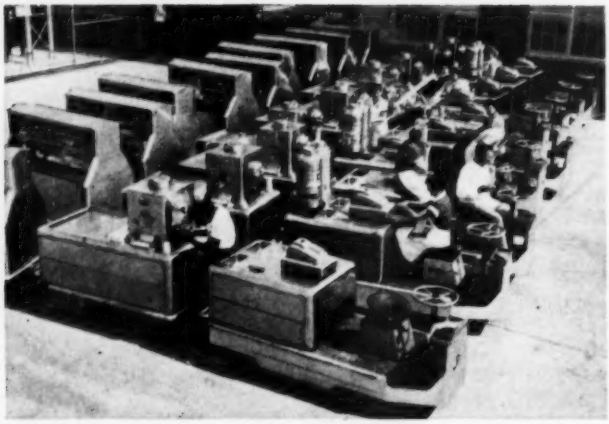
23 *A compartment that keeps butter soft.*

24 *An egg dispenser inside refrigerator.*

25 *A food-delivery area that can be reached from both sides.*

26 *A horizontal food freezer built into wall.*

27 *A fruit-juice dispenser inside freezer.*

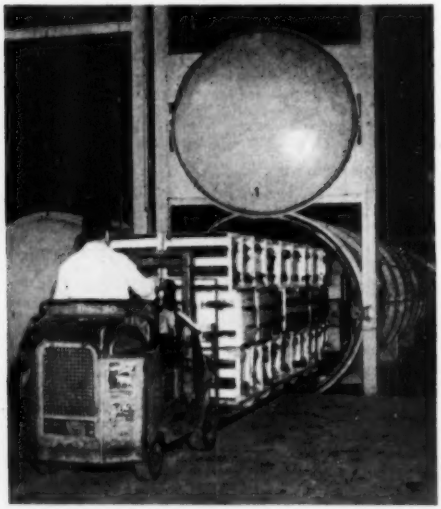


Rolling Cafeterias Serve 3,000 in 12 Minutes

TWELVE trains of cafeteria cars deliver hot meals to Douglas Aircraft workers at El Segundo, Calif. The stainless-steel fleet rolls from the kitchen to 10 dining rooms where the drivers plug in extension cords to keep the food hot. Each train of three carts hauls two coffee urns, two cold-drink dispensers, hot and cold foods, and desserts.

Kangaroo Tie Has Zippered Pouch

THIS tie gives a boy one more pocket for treasures. Bodek Cravat Co., 16 W. 30th St., NYC, says it's for coins or a key.



Quick Chill Keeps Lettuce Crisp

THAT'S fresh-picked lettuce—half a carload—entering the tube above. When the big door comes down, the lettuce will be vacuum-cooled from field temperature to 32 degrees in 30 minutes. Cooled and dried of moisture, it will go direct from the tube to Southern Pacific refrigerator cars outside the packing plant in California's Salinas Valley.

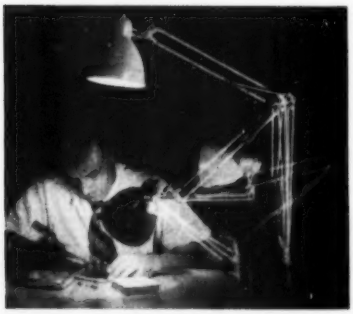
Plow Clears Its Own Blades

MOUNTING spidery spiked wheels on a slim shaft just above the blades of a plow, D. E. Krehbiel, retired grain-elevator operator of Pretty Prairie, Kan., has neatly solved the ancient farm problem of keeping the blades clear of field-strewn straw. The wheels turn as the plowed earth pushes against them, and when they are not needed they can be swung up out of the way.

He's Measuring Dew

THIS is not a TV antenna but a dew gauge—a research tool for plant study. Dew is deposited on wood blocks fixed to a central rod at different levels above ground. Shemuel Duvdevani hopes his experiments at Caltech and in Israel will help farmers in dry zones.

▶▶▶How many species of trees grow in the U.S. and Alaska? A nine-year census by the Forest Service puts the count at 1,027.



Lamp Twists Any Way

A TOUCH of the fingers positions this lamp to throw glare- and shadow-free light on your work. Available with a variety of brackets and bases, it can be fastened or set almost anywhere. The Luxo is sold by E. A. Roffman Associates, 303 E. 51st St., NYC 22.

Clock Shows You the Time on Mars

WHEN travelers take off in spaceships, they may check their watches with clocks like this one. The first interplanetary timepiece, it records the hour, day, month and year on Earth and on Mars. The clock divides the Martian year into 12 months—eight of 56 days and four of 55 days. The 24-hour markings around the face indicate Martian time. Actually, the day is about four percent longer than a solar day on Earth, so the hands are geared to move slower than those on the inset Earth dial.

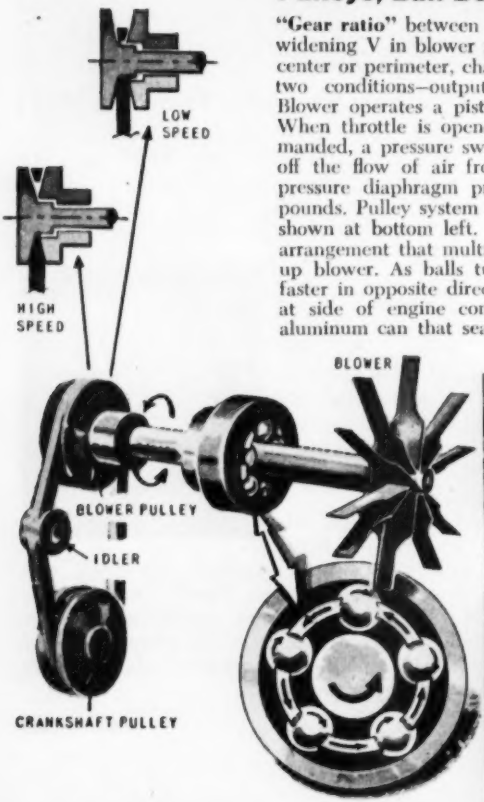
Dr. I. M. Levitt, director of Franklin Institute's Fels Planetarium, invented the clock and Ralph B. Mentzer, Hamilton Watch Co. engineer, built it. Because Hamilton's experimental facilities were tied up in defense work, Mentzer turned out the clock in his home workshop (above) using his own tools and equipment.

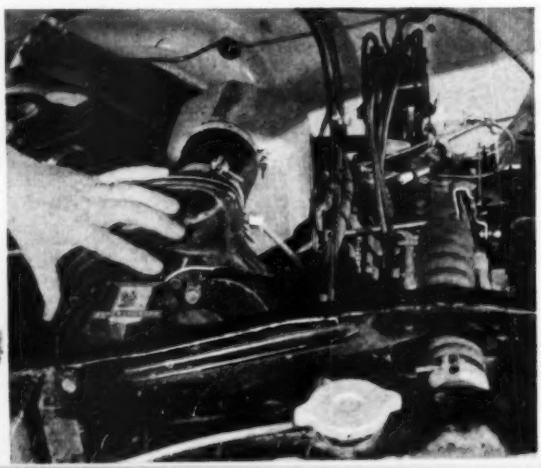
Supercharger Hops Up '54 Kaiser

By Devon Francis

Pulleys, Ball Bearings Produce Power

"Gear ratio" between engine and blower is changed by narrowing or widening V in blower pulley (top drawings). This slides belt toward center or perimeter, changing rate of rotation. Width of V responds to two conditions—output of blower and engine manifold pressure. Blower operates a piston that, in effect, governs diameter of pulley. When throttle is opened, however, and high blower pressure is demanded, a pressure switch on manifold actuates a solenoid that shuts off the flow of air from blower to pulley-control piston. A safety-pressure diaphragm prevents blower pressure from going over five pounds. Pulley system and gearless "planetary set" driving blower are shown at bottom left. Next sketch is a head-on view of ball-bearing arrangement that multiplies rate of pulley rotation 4.4 times to speed up blower. As balls turn against outer rim of race, they spin shaft faster in opposite direction. Photo at bottom right is blower installed at side of engine compartment. Behind it is the carburetor in an aluminum can that seals it against normal atmospheric pressure.





For the first time in 17 years, a U. S. passenger car has been fitted with a blower. Result: 22 more horsepower.

WHEN the new Kaiser cars had their wraps taken off in the dealers' showrooms the other day, they had something that the nation's hot-rodders have been clamoring for all along—a factory-installed supercharger.

After driving the 1954 Kaiser Manhattan, I have an idea that it is going to appeal to a lot of people who wouldn't know a drag strip from a drachma. Ordinary citizens, ignorant of the exotic aspects of motoring, will grow to like supercharging, too.

I was incredulous when I felt the added boot at the rear wheels of the new Kaiser. It beat last year's Kaiser—with an identical but "unblown" engine—for instance, by more than seven seconds in accelerating from zero to 60 miles an hour.

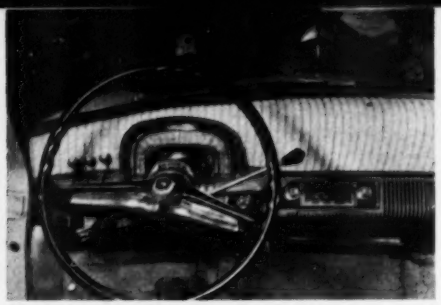
The introduction of a supercharger on a U. S. production automobile for the first time in 17 years came about through a neat combination of two circumstances:

An aircraft-type supercharger for automobiles had just come on the market, and Kaiser wanted more horsepower without the headaches of redesigning an engine.

Blower Gives Old Engine New Life

By blowing its engine, Kaiser has managed to suck 22 more horsepower out of a modest-sized L-head six normally rated at 118. While practically everybody else in the industry was whipping engines into a lather in the horsepower race, Kaiser quietly slipped in with a fresh and creditable performance with a power plant design basically eight years old.

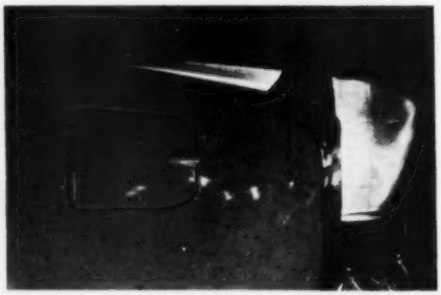
Supercharging is an inexpensive way of subcutaneously injecting more oomph into an automobile. Here is the performance, in seconds on a stopwatch, that I racked up with an untuned 1953 Kaiser



REDESIGNED PANEL centers instruments in front of driver. Ventilating controls are of airplane type. Lowered hood lets the driver see ground only 15½ feet in front of car.

CRASH PAD above instrument panel is duplicated on back of front seat for rear-seat passengers. Famous for its trims, Kaiser for '54 has some of industry's richest fabrics.

REAR-WINDOW DEFROSTER is simple heating-coil unit with fan. Wrap-around design gives Manhattan total of 3,964 square inches of glass area, slimmed-down support posts.



GLOW AREA of tail lights has been extended into modified fishtail, providing added warning when seen from side. Additional lighted portion is 18 inches long, 1⅝ high.

and a 1954 Kaiser that had not yet been broken in:

	1954	1953
0-60 m.p.h.	14.6	21.9
0-80	26.1	43.6
40-60	9.3	16.9
40-80	22.0	35.7

The Kaiser blower, standard equipment on the Manhattan, is made by McCulloch Motors Corp., Los Angeles (PSM, Dec. '53, p. 168).

The sole function of a blower is to cram more air into the cylinders. That boosts the compression and makes the fuel burn better. Hence, more power. Blowers have been used now and then on production automobiles since early

[*Continued on page 272*]

FACTS ON '54 KAISER

Model: Manhattan 4-door sedan.

Engine: 6-cyl. L-head; 140 hp. at 3,800 r.p.m. (with supercharger); compression ratio, 7.3:1; piston displacement, 226.2 cu. in.; bore and stroke, 3 5/16" by 4⅜"; piston travel (in feet per car mile at 20 m.p.h.), 1,790; crankshaft bearing surface, 44.6 sq. in.; torque, 215 lb.-ft. at 2,600 r.p.m.

Weight: 3,491 lb. (dry); per hp., 24.9 lb.

Transmission: Hydra-Matic; rear-axle ratio, 3.31:1.

Steering ratio: 15.1:1 (with power steering); radius of turning circle, 19'.

Effective brake-lining area: 176 sq. in.

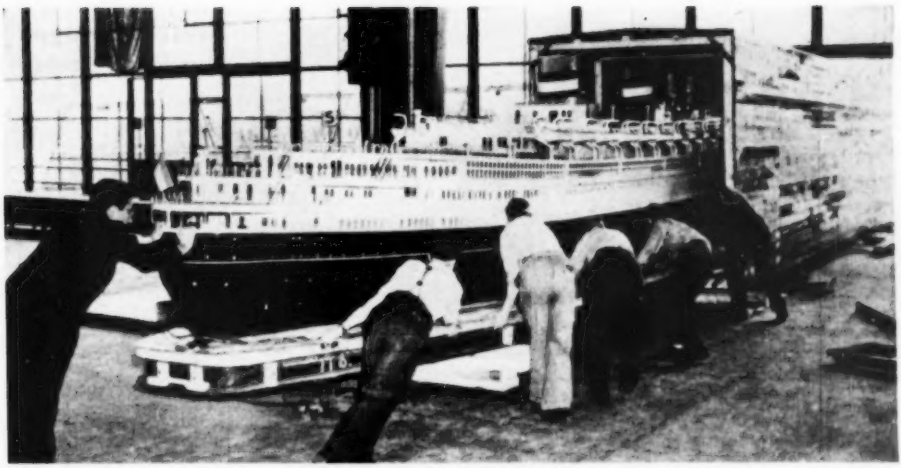
Springs: front, coil; rear, semi-elliptic.

Outside dimensions: height (loaded), 60.25"; over-all length with bumpers and guards, 215.62"; width, 74.87"; wheelbase, 118.5"; overhang, front 42.38", rear 54.75"; tread, front 58", rear 58.7".

Inside dimensions: seat-cushion width, front and rear 63.1"; leg room, front 45.3", rear 39.6"; headroom, front 35.7", rear 33.7"; seat height, front 11", rear 12.7"; vertical distance, steering wheel to seat cushion with seat in mid-position, 5.5"; front-seat adjustment, horizontal 7", vertical 15/16".

Tire size: 6.70 by 15.

Price: $2,453.53 at Detroit, without state or local taxes.



World's Largest Ship Model Is Crated for Ocean Voyage

MANY a real yacht is not much bigger than this ship model. Forty feet long and weighing 1½ tons, it is a 1/20-size reproduction of the SS *Nieuw Amsterdam*, flagship of the Holland-America Line. It is shown being crated in Rotterdam to cross the ocean to the National Sports and Boat Show in San Francisco.

Color TV Set Flips Its Lid

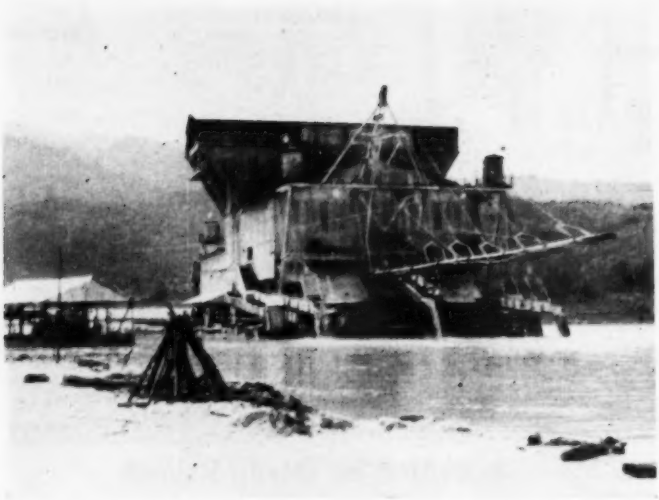
THE top of one new color TV set lifts off without tools to expose the chassis for easy picture-tube adjustment. A "color killer" cuts out color circuits automatically when black-and-white telecasts come in. An Admiral, the set sells for $1,175.

Dental Drill Runs on Battery

ARMY dentists can buzz away on a soldier's teeth far from power lines with this drill. Devised by University of Michigan researchers for field use, it carries its own motor and operates off a Jeep battery.

Missiles Ride Odd Trailer

THAT's not an oil truck above but a guided-missile toter. The cylinder opens to take the missile, then rotates to keep its 12-foot-wide load within road clearances. Spencer-Safford Loadcraft, Inc., Augusta, Kan., built the trailer for Chance Vought.



Armed Dredge Guards Miners

GUERRILLA snipers give tin mining in Malaya something of the atmosphere of a cowboys-and-Indians movie. Heavy armor guards the miners working this giant dredge at the Rawang mine at Serendor. The three turrets visible atop the dredge superstructure are steel-protected machine-gun positions, the U.S. Bureau of Mines reports. Each turret also has a searchlight.

Tiny French Jet Can Land at 45

THE first French delta-wing jet—perhaps the world's smallest—is being flight-tested. Called the Payen Pa 49, it has a wing span of only 20 feet and a top speed of only 250 miles an hour. But it lands at 45. The Palas gas-turbine engine produces a mere 352 pounds' thrust—U. S. turbines go up to 10,000 pounds.

They Say Now.....

DR. SPAFFORD ACKERLY, UNIVERSITY OF LOUISVILLE: *"Too often the aged accept their aches and pains as normal for that age. They are not normal... Let the old people... gripe on all the problems that affect them. That is the only way we are going to make progress in the treatment and prevention of these problems."*

DEAN GEORGE R. HARRISON, MIT: *"Science is the greatest agency yet discovered for changing things to what they ought to be."*

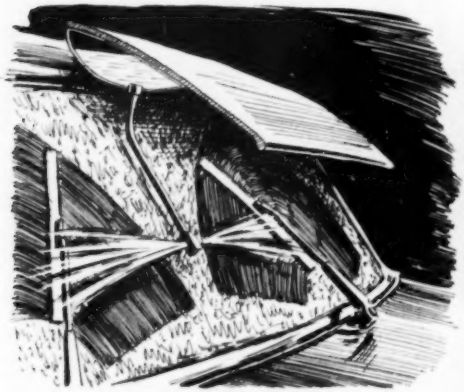
PROF. MILTON E. PARKER, ILLINOIS INSTITUTE OF TECHNOLOGY: *"By 1957, the United States must boost agricultural production by the equivalent of 115,000,000 acres just to feed and clothe the predicted increased population."*

EZRA TAFT BENSON, SECRETARY OF AGRICULTURE: *"The research of today shapes the welfare of our country tomorrow . . . Truly, knowledge pays the best interest."*

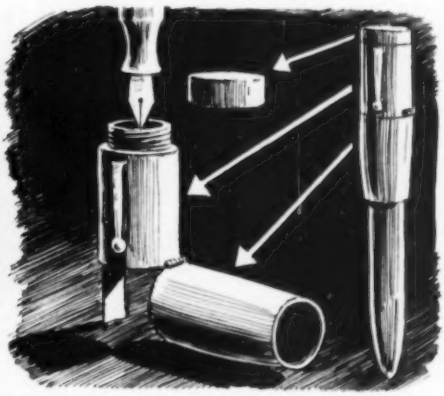
New Ideas

FROM THE INVENTORS

1 Suit to Cool or Warm Wearer. Air-conditioned clothing would permit people to work more comfortably and efficiently near furnaces, in laboratory ovens, refrigerators, and other hot or cold places. These airtight coveralls would be spaced off the wearer's body by porous, elastic liners so that air tubed in from a cooling or heating system could circulate freely to all parts of the garment.



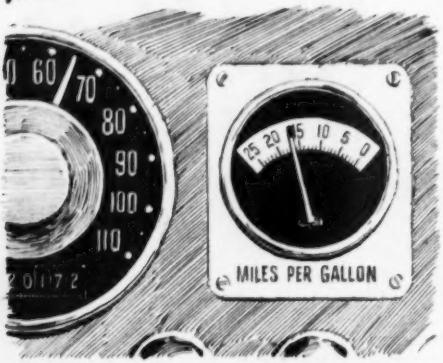
2 Visor to Spray Windshield. Hooked under a sun visor, one part of this water-carrying attachment would provide a windshield-cleaning spray. A metal tank would hold the wash water. A separate, evaporation-cooled canvas sack would carry a supply of drinking water that could be piped into the car through a separate tube and valve.



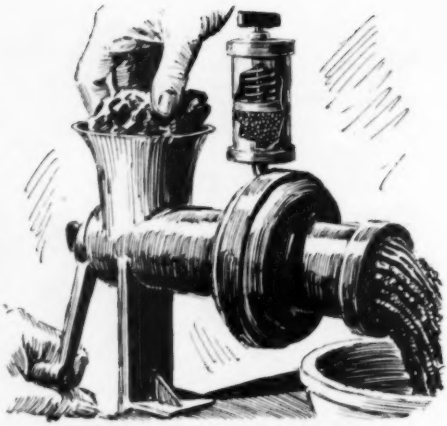
3 Pen Cap to Hold Extra Ink. You wouldn't be likely to run out of ink if your pen cap held an emergency supply. The upper part of this cap would form a leakproof reservoir and would be hinged to the part that covers the point. Bent open as shown, it would hold the ink chamber upright while the pen was being refilled.

Please turn the page for more new ideas.

MORE New Ideas from the Inventors



4 Gauge to Show Fuel Efficiency. A direct-reading, miles-per-gallon indicator would warn a driver when wrong speed or engine sluggishness was wasting gas. This system would generate two currents, one keyed to wheel speed, the other to fuel flow. A meter circuit would integrate the two to relate gas used to distance traveled.



5 Meat Chopper to Add Spices. Hamburgers would come out of this grinder thoroughly seasoned, and with the flavoring distributed evenly through the meat. Dry or liquid spices placed in a hopper would be added to the meat at a uniform rate and mixed in with it. The cook would pick out the spices and set the hopper's rate of feed.

6 Ramps to Ease Parking Squeeze. Overhead streets, says this inventor, could provide the extra curb space needed in many business and shopping districts. He would have cities and property owners join in building two-lane elevated strips having access ramps for cars, footwalks and stairways for pedestrians. He points out that upper-level store displays and entrances would give buildings two street floors.

7 Ice-Type Skate to Have Wheels. You could glide the same way winter and summer if your roller skates had in-line wheels. These would behave like ice runners and allow you to cut the same figures with the same form. Wheels would be individually sprung and cushioned to make them "float" over bumps and pavement cracks.

8 "Flameless" Torch to Raise Paint. You wouldn't have to worry about scorching a wall or setting it on fire if you burned off paint with this torch. The flame, enclosed in a metal hood, would heat a sole plate. A spacer shield would keep the hot plate from touching the surface but let it come close enough to soften the old coat.

9 Cage to Guard Drive-In Teller. This glass wall would protect drive-in bankers against bad weather and motorized thieves. The teller would be completely inaccessible from the outside though he would be able to talk to customers over an intercom and shuttle cash and papers back and forth through a sliding drawer.

U. S. patents on these inventions have been granted to: 1. A. M. Klein, Brooklyn, N.Y., and J. F. Hall, Jr., Dayton, Ohio.; 2. E. E. Foster, Austin, Tex.; 3. M. Fried, Brooklyn, N.Y.; 4. T. O. Zschokke, Perris, Calif., and H. H. Chappell, Sunnymead, Calif.; 5. L.H. Balmain, Fair Oaks, Calif.; 6. H.A. Lebert, Millbrae, Calif.; 7. E. Kahlert, Santa Ana, Calif.; 8. J. Prent, Amsterdam, Netherlands; 9. E.C. Beedle, Bay Village, Ohio.

How Louisville Sluggers Are Made

Ted Williams swings his Louisville Slugger.

Behind the batter are the craftsmen who make the stick that swats the ball.

By George Laycock

PROFESSIONAL ballplayers treat their favorite bats with love and respect, handle them gently except at home plate, and frown at anyone who dares touch them. They know that it takes a lot of skill to make a good bat, just as it does to use it.

You can get a look at the batmaker's skill if you stop in at Hillerich and Bradsby in Louisville, Kentucky, home of the best-known bat in baseball, the famous Louisville Slugger. Nearly all of the players in both the major and minor leagues swing bats from this factory. They know that no place else in the world is there more know-how about making baseball bats.

From this plant comes about half of the country's estimated annual production of six million bats, almost equally divided between soft- and hard-ball bats. There are about 200 styles and sizes.

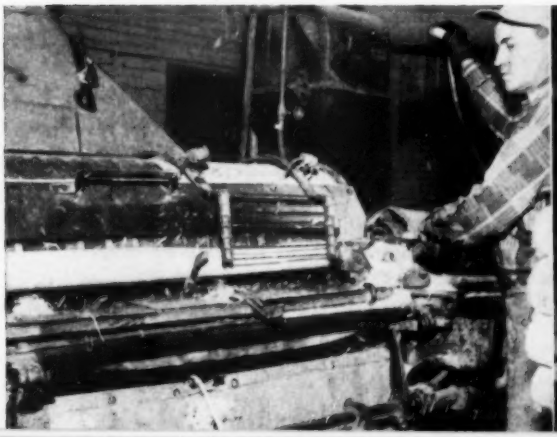
The best baseball bats get their start on the wooded mountain slopes of Penn-

1 CHOICE WHITE ASH makes best bats. Cut to 40-inch lengths, small logs are split into wedges and turned into "rounds," while big ones are sawed into bat-size squares.

2 BILLETS, or rounds, are examined and graded by a timber inspector. He determines the size bat each will make and marks the handle end. Billets are then cured.

Several million bats-in-the-rough are stacked in the big seasoning yard for 12 to 18 months.

3 CURED BILLET goes into a turning lathe. Within 15 seconds, a set of 49 razor-sharp knives has roughed out the timber into the general shape of a baseball bat.



4 ROUGH-OUTS are carefully weighed and each piece is graded according to the model for which it is best suited. Inspection is continuous along the bat assembly line.

5 KNIVES of this final turning lathe are adjusted to cut and form rough-outs to the exact length, diameter and shape of the original handmade Yogi Berra bat.

6 SANDING is important. Here a rough job is being done by a powered sander belt. During production homestretch, each bat gets a light hand-rubbing with steel wool.

sylvania and New York. Most of them are made from white ash, which has the required tensile strength and resiliency and is lighter than hickory, its nearest competitor. Timber buyers who locate ash for bats look for trees with straight, even grain.

From the cream of this ash crop come the Louisville Sluggers, each branded with the autograph of a major-league player. A player's name on one of these bats, even if they're turned out by the thousands, means that the bat is patterned after one that the player has used. The company started collecting autographs back in 1905, when Honus Wagner offered them the use of his name.

The First Slugger Is Made

A separate department hand-turns individual bats to order for professional players. In fact, that's how Hillerich and Bradsby started making bats back in 1884. In those days the company concentrated on butter churns and fancy porch railings. J. Fred Hillerich didn't want anything to do with such fads as making ball bats.

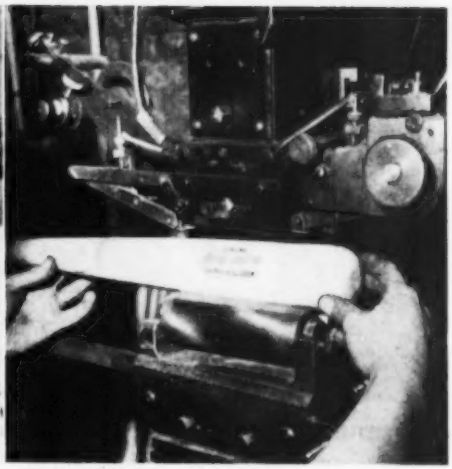
But Bud Hillerich, his son, was a red-hot baseball fan. That was why he spent a large part of one evening in 1884 turning out a bat for Pete Browning, a Louisville star of the day. Browning had broken his favorite bat. Bud Hillerich volunteered to pull him out of the hole, and the following day, with a firm grip on his new bat, Browning racked up three safe hits in three times up.

Bats are still turned out for professionals in much the same manner. Here's what happens if the Cubs wire Louisville for a half-dozen bats for Hank Sauer. First, the original of Sauer's personal model is taken from the archives, a locked, fireproof room stacked with hundreds of bats used by professional players of today and yesterday. A skilled judge of bat timber takes the model to the timber stacks and selects just the piece which, when turned to an exact duplication of Sauer's bat, will match it in weight to within a fraction of an ounce.

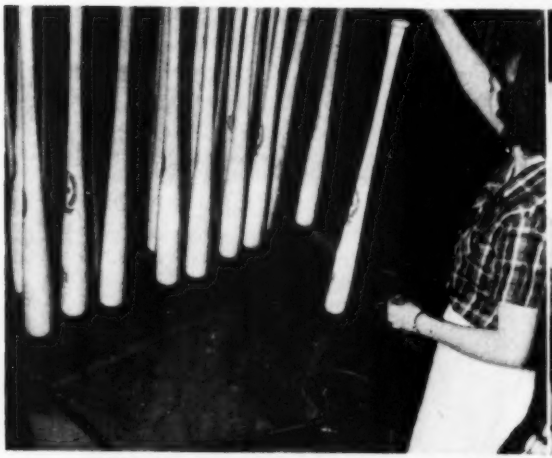
In the turning shop, the model is put in a parallel rack on the lathe into which the selected billet is locked. The new bat is turned with hand chisels until it is an exact duplicate of the original.

Bat craftsmen recall some peculiar demands made on them by players. Babe Ruth always wanted his bats to have tiny pin knots around the "sweet spot" where

7 INSPECTION again. Under daylight lamps, all bats must pass the critical eyes of highly skilled men. If there are no newly exposed defects, they go to final automatic sander.



8 AUTOGRAPHS of ballplayers are branded on commercial copies of their original Slugger models. Most big-league players are represented. Above is Mickey Mantle model.



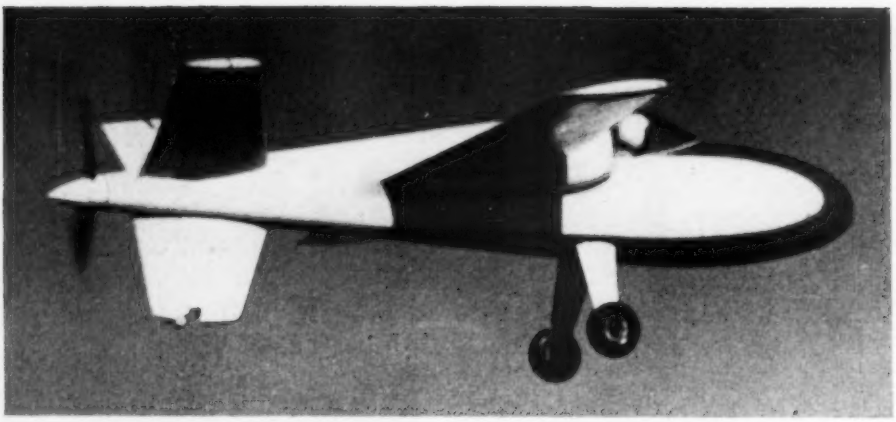
9 BATS are given either a natural-grain finish or stained in a choice of colors. Here a girl dips bats into a clear-lacquer vat and then hangs them up to drip and dry.

10 FINAL TREATMENT on waxing and buffing machine puts glass-hard finish on the bats. They are now ready for shipment to little-leaguers and sandlotters everywhere.

the ball hits. He ordered more bats than any other player, although he seldom broke one. Instead, he passed them out to admirers. Eddie Collins demanded bats with a streak of red heartwood in them. Hugh Duffy always bounced the rough billets on the concrete floor until he found one with just the right "ring."

"When you're choosing a bat," say the Louisville Slugger makers, "get one just long enough to cover the plate from your proper batting place. This lets you reach all pitches in the strike zone."

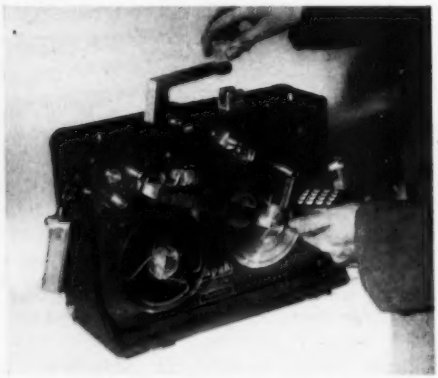
Last year, when the subject of laminated bats came up, the bat experts in Louisville had already put years of research into them. But they think the laminated bat hasn't yet been made that can hold its own against the solid-wood club at home plate. END



Prop in Tail Pushes Sports Plane 200 Miles an Hour

THIS little prop-in-tail experimental plane, called Sierra Sal, hits a top speed of 200 miles an hour. An 80-hp. Continental engine buried in the fuselage aft of the pilot spins the 57-inch plastic prop. The owner-designers, aircraft engineers Walt Fellers and Ron Beattie, say that the V tail prevents turbulence, as only one prop blade at a time is in a disturbed area.

The rudder, set below the fuselage to protect the prop (right), carries the tail wheel. Built to Goodyear Trophy Race specs, the 18-foot-long plane with 20-foot span weighs only 600 pounds.



Now—the Walkie-Recorder

A NEW spot-news recorder for broadcasters is run by a spring-wound motor, cranked with the carrying handle. Recorder, mike, monitor phone and a spare tape fit into the case. It can be shut and used while slung over the shoulder. Broadcast Equipment Specialties Corp., 135-01 Liberty Ave., Richmond Hill 19, N. Y., makes it.

Car Ferry Rides the Rails

THE cars and motorcycles above are crossing the North Sea, but not under their own power. They are being ferried across on a freight train. The tracks are laid down on an earthwork dam, the only connecting link between the Isle of Sylt and the German shore. The roadbed, called the Dam of Hindenburg, stretches more than 24 miles.

An Atomic Locomotive Could Be Built

Here's how a noted designer of reactors would construct it, provide shielding against the radioactivity of its power plant, refuel it—and revolutionize railroading.

A MIGHTY 7,000-hp. engine called the X-12, first atom-powered locomotive ever designed, is technically feasible. Within two years it could be hauling a high-speed Atomic Limited across country. Eleven pounds of uranium would fuel it for a year.

These are highlights of an atomic-locomotive study by a University of Utah group under the leadership of Dr. Lyle B. Borst, professor of physics and a former designer of nuclear reactors for the Atomic Energy Commission. Five railroads and nine industrial firms cooperated in the project, a private one having no connection with the AEC. Its conclusions are told in a remarkable 54-page report entitled, *An Atomic Locomotive: A Feasibility Study.*

Uranium Cost Is Secret

Because the study used only nonsecret data, nothing about it is censorable, and so the report is able to give the most revealing picture to date of the mechanical details of applying atomic power to vehicular propulsion.

For the same reason, the report necessarily lacks one secret figure—the exact cost of pure uranium-235 fuel—that is all-important in determining whether atomic choo-choos are the coming thing. But from what he considers a reasonable estimate, Dr. Borst predicts that "the proposed locomotive will compete successfully with diesel power under favorable circumstances."

Primarily, the object of the study was to learn whether an atomic locomotive could be built at all—a possibility doubted by many experts. The researchers believe they have a workable design.

Outwardly resembling a streamlined diesel, the projected "atom burner" is 160 feet long. It has two sections. The forward one, a power unit devoid of a smokestack, contains the nuclear reactor and its massive shielding. It also houses a steam turbine, electric generators, and electric traction motors to apply power to the 12 driving axles. In short, it is a turboelectric locomotive, whose steam boiler is built into and around the nuclear reactor itself.

The trailing section carries radiators equal to more than 1,000 automobile radiators, and its roof is studded with whirling fans. Its purpose is to cool the water circulated to it from the condenser of the steam turbine, and thus transfer excess heat from the atomic power plant to the surrounding atmosphere.

Fuel Will Be Liquid

Designers of this 360-ton rail giant visualize it at the head of a crack passenger train or a fast freight. The big advantage over conventional types that they

predict for an atomic locomotive—lower fuel cost—will show up best in hauling heavy loads at high speeds with short turnarounds.

The heart of the X-12, its six-sided nuclear reactor, is three feet square and one foot thick. It can be so small because it burns uranium of the concentrated U-235 variety. Its fuel will be in liquid form—a solution of uranyl sulfate, a yellow or yellow-green salt of uranium, in water.

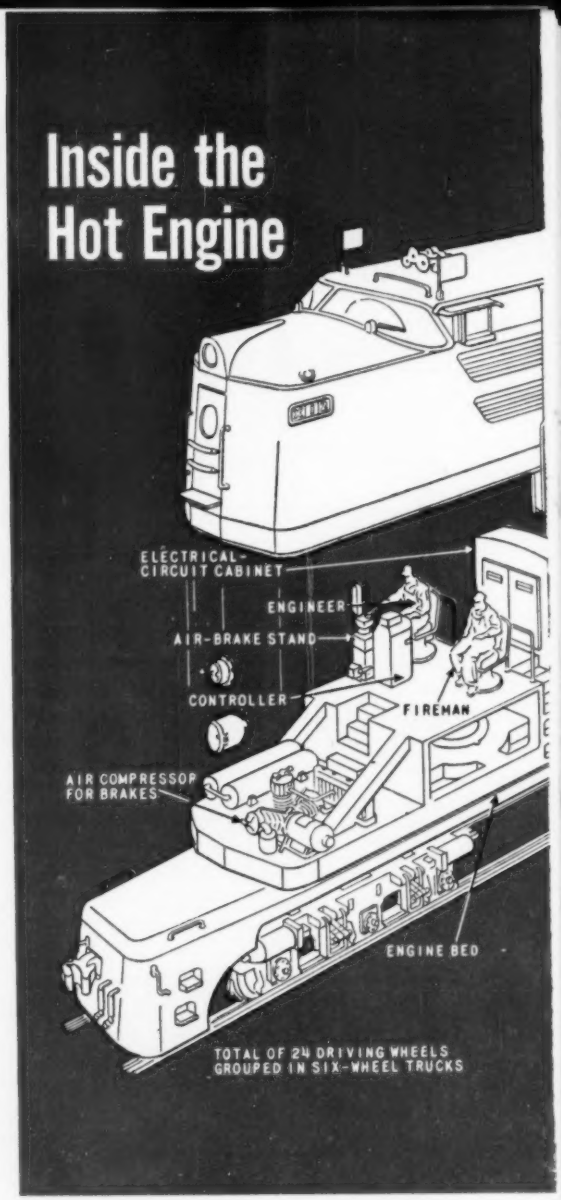
When control rods are withdrawn from this liquid-fuel "soup," a chain reaction takes place. Its heat vaporizes pure water in a surrounding jacket, the boiler that supplies steam to the locomotive's turbine. The pure water circulates not only through the jacket, but also in 10,000 pencil-thin stainless-steel tubes extending through the soup in the reactor, to pick up heat more readily.

Once steam is up and the atom burner is rolling, its engineer's task is a simple one. Principal instruments in his cab will be a conventional steam-pressure gauge and ammeter, and he will use a standard controller for a throttle.

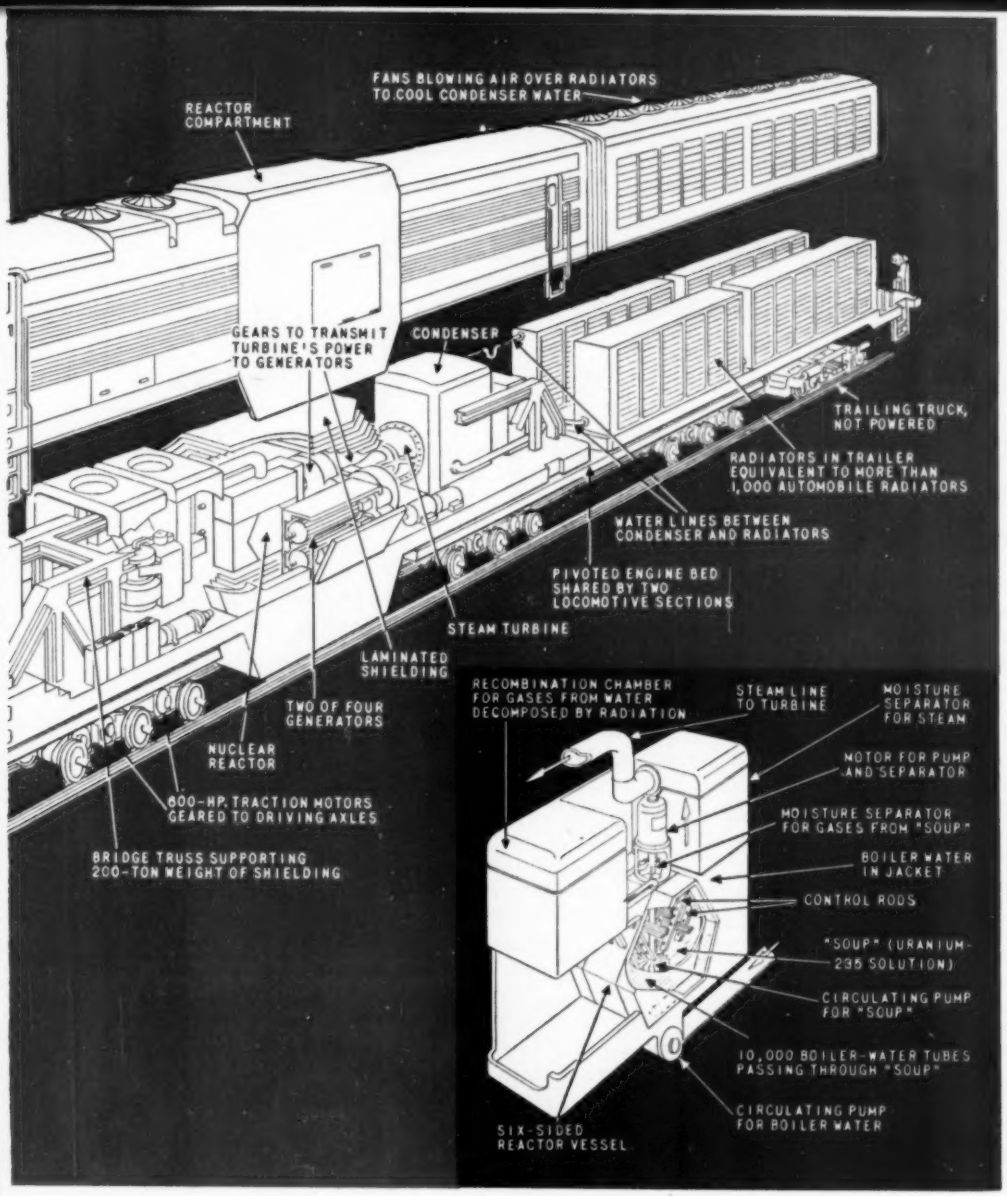
Reactor Is "Infinite" Power Source

One outstanding feature of an atomic express, noticeable to engineer and passengers alike, will be its rapid pickup. The X-12 could be designed to accelerate a 5,000-ton train from a standing start to 60 m.p.h. in three minutes and 32 seconds. The reason is that, while its normal power is 7,000 hp., its reactor actually is an "infinite" or unlimited power source. So the engine could have an "overload capacity" of, say, up to 12,000 hp. for short periods.

How can the intense radioactivity of the X-12's power plant be kept from endangering the train crew, and passengers and bystanders on station platforms, too? Here was the stumbling block for would-be designers of A-locomotives, concluded one survey of atomic-power possibilities that was published by Princeton University in 1950. Its authors reported that stopping the deadly rays would take at least 100 tons of shielding, seemingly too much bulk to fit within the clearance limits of a locomotive.

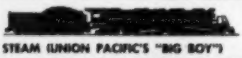


But the X-12's designers have succeeded in shoehorning 200 tons of shielding, twice this amount, within the allowable limit of a locomotive's breadth. To do it, they use such unconventional machinery as "dachshund" generators with rotors eight feet long, which can be squeezed into spaces only two feet wide and deliver the needed power.



Thus the reactor can nestle within a massive block of shielding four feet thick, measuring 10 by 15 by 15 feet over-all. It will consist of alternate layers of steel, to confine gamma rays; and of a neutron-stopping "hydrogenous material," which could be water, paraffin or plastic.

How can safeguards be provided against the new peril of radioactivity on the loose, in case of a wreck? First, the successive steel layers of the massive shielding will keep a collision from spattering the wreckage with radioactive soup; even if some layers were ruptured, others would remain intact. Second, a crash would automatically shut down the reactor. Control rods are mounted at 60 degrees from the horizontal, and each mounting includes a shear pin, or weak link. An impact from any direction exceeding a force of 1/5 of a "G" will snap the shear pins, and momentum and grav-

TYPE OF LOCOMOTIVE	WEIGHT	LENGTH	DRIVING WHEELS	HORSEPOWER	FUEL CAPACITY
 STEAM (UNION PACIFIC'S "BIG BOY")	597 TONS	130 FEET	16	6,670	COAL: 28 TONS WATER: 25,000 GAL.
ELECTRIC (VIRGINIAN'S MOTOR-GENERATOR TYPE)	500 TONS	150 FEET	32	6,800	———
FOUR-UNIT DIESEL (GENERAL MOTORS' F-7)	486 TONS	201 FEET	32	6,000	FUEL OIL: 4,800 GAL.
GAS TURBINE-ELECTRIC (UNION PACIFIC)	250 TONS	84 FEET	16	4,500	FUEL OIL: 7,000 GAL.
ATOMIC (X-12)	360 TONS	160 FEET	24	7,200	URANYL SULFATE SOLUTION: 64 GAL. (CONTAINING APPROX. 20 LB. U 235)

ity will do the rest. From withdrawn position, the control rods will be driven or will fall back into the center of the reactor, stopping the chain reaction.

When the locomotive is running at full power, the nuclear reactor will develop heat at the rate of 30,000 kilowatts, and the soup temperature will be 455 degrees F. While this temperature rapidly vaporizes the boiler water in the tubes, the uranium-solution soup itself will not boil, because of the pressure of 650 pounds to the square inch under which it is confined in its vessel.

But provision must be made for another thing that happens to it, and a strange one.

Water Must Be Reconstituted

Under the intense radiation of the reactor, the water of the soup breaks down into hydrogen and oxygen gas—at a rapid enough rate for 10 percent of the 64 gallons of soup to be lost in only 13 minutes. To offset this and maintain the volume of soup intact, the hydrogen and oxygen gases are led to a novel auxiliary device called a recombination chamber. Here a chemical catalyst reunites them, to form water again, and the water is returned to the soup vessel.

In all, then, there are three separate water-circulating systems: for the reactor's soup; for the boiler water and the steam it makes, which is condensed and piped back to the boiler after driving the turbine; and for the cooling water of the steam turbine's condenser. Since each is a closed system and returns the water to its original source, the water consumption of the X-12 is negligible.

Refueling will be a major operation requiring two to three days, and to be performed only by atomic experts skilled in handling "hot" materials with remote-control implements. It must be done three to six times yearly. While only 10 percent of the uranium may have been consumed in the interval, enough atomic "ashes" or fission products will have accumulated to hinder the chain reaction. So the soup must be drained from the reactor, purified in a chemical plant and replaced, together with enough fresh fuel to make up the original amount. As the designers foresee, this will call for "elaborate and costly facilities." At first, A-locomotives could best be refueled at special "atomic-fueling stations," established and operated for the purpose by the AEC. Eventually, the railroads might undertake the job.

Maintenance Is "Designed Out"

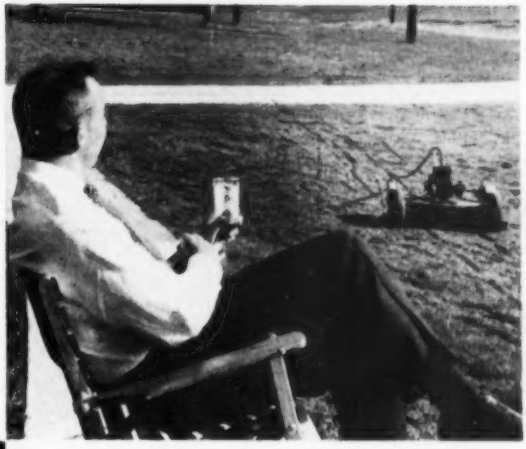
Maintenance, too, will be an unprecedented problem. Inevitably some radioactivity will contaminate the steam turbine—and keeping a "hot" turbine in repair hardly seems an appealing task. But unlike a reciprocating diesel engine, a rotating turbine is a balanced machine and requires comparatively little maintenance.

As for a nuclear reactor, maintenance work must be "designed out" at the

[*Continued on page 276*]

Electronic Lawn Mower Cuts the Grass While Its Operator Relaxes

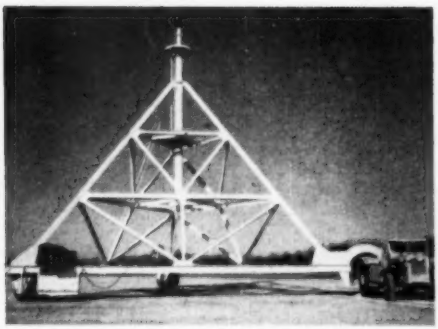
"HMM! THAT LAWN MOWER is doing quite a neat job," muses the comfortable armchair workman at right. His exertion in cutting the grass is limited to working simple controls on a little black box in his lap and managing not to spill his drink. The girl below is pushing a light dolly for trundling the 250-pound mower uphill or over rough ground.



PUSH-BUTTON lawn mowing is here. You can now lounge in the shade while a robot grass cutter does all the work. It will cost you a few dollars more than the kind of power mower that you have to follow around, but then, think of the shoe leather you'll save.

All that the Homko Robot demands of you is that you stay within 40 feet of it (the length of its cable) and occasionally flick a switch. It is a 20-inch, reel-type, electric lawn mower with a ⅓-hp. motor and two remote electronic controls. One starts, stops and reverses the Robot; the other turns it to the left or right. An alert operator can turn it in a tight circle.

The mower, made by Western Tool & Stamping Co., Des Moines, costs about $180.



Tractor Tows Blimp Anchor

EASIER and faster hauling of blimps on the ground is made possible by a new gooseneck drawbar assembly at one corner of the traditionally triangular mobile mooring mast. The Goodyear Aircraft Corp. and the Navy worked it out together.

NATO Armies Agree on a Rifle

A BRITISH infantryman is here demonstrating the 9-pound 3-ounce Belgian rifle recently chosen as a common weapon for the NATO armies. It is a 30-caliber gas-operated weapon capable of fully automatic fire. The barrel is 21 inches long.

Radioactive Detective Puts an Eye on Hungry Shipworms

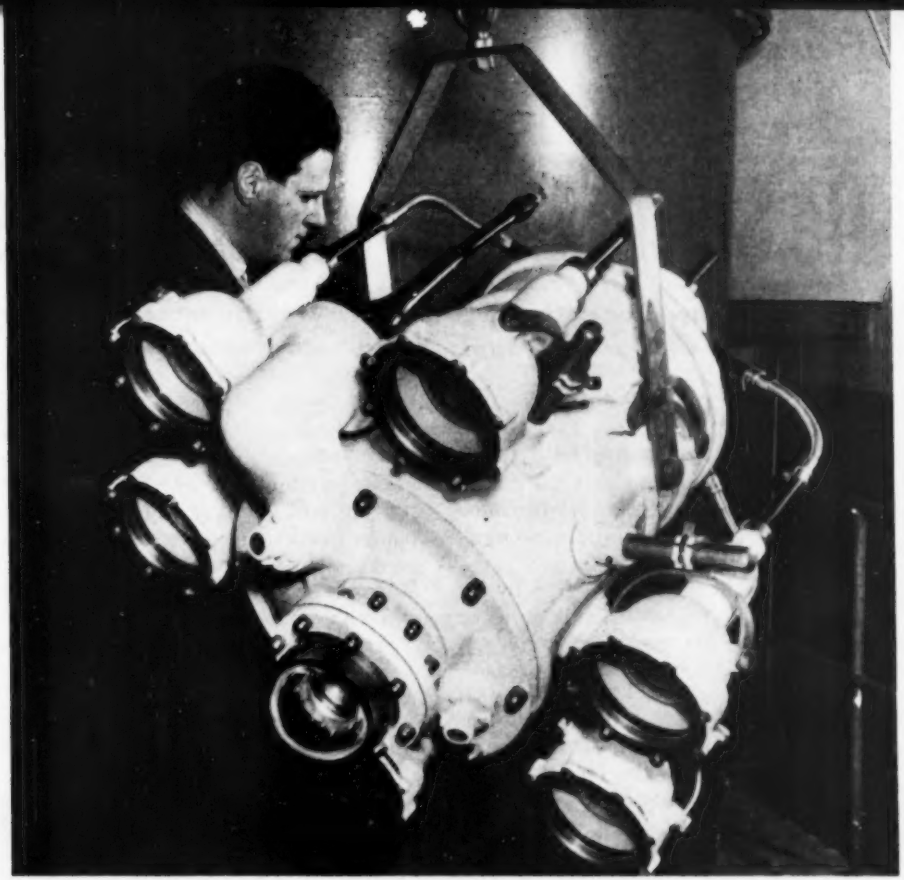
SHIPWORMS infesting dock pilings can't hide from the eye of the underwater camera at left above. To peer inside the wood, a metal sphere containing a pinhead of radioactive iridium is set on one side of a piling with a loaded waterproof film holder opposite it. When an aperture in the sphere is opened, rays passing through the wood make an image on the film. Above, piling is outwardly sturdy, but the radiograph taken with the Battelle Memorial Institute camera shows borers at work inside.

Portable Drill Samples Wool

TO TAKE samples of wool stacked in a government warehouse, this workman uses a long, tubular plastic bit on a Black & Decker drill to draw cores from random bags. The technique was devised by the Department of Agriculture.

Movie Helps Train Marksmen

THIS target-practice setup worked out by a former German officer lets riflemen trade shots with soldiers on sound film. The projector stops when a hit is made and a light behind the screen shows how much damage was inflicted on the "enemy."



Camera Eye Roves for Underwater TV Shots

THE eye of this underwater TV camera can look all around while the camera itself stands still. A new English lens on the end of a tube swivels in a 90-degree arc like a periscope. The tubular mount moves too, rotating in a full circle. Remote switches adjust the lens, which is surrounded by spotlights.

Logs Shoot the Chute to Bypass Idaho Dam

LIKE the famous "fish ladders" in reverse, a chute funnels logs past Albeni Falls Dam so they can continue their downstream trip on Idaho's Pend Oreille River. A pocket of logs that shot the chute can be seen at the lower left.

He Shifts Gears with Faucets

Small-town inventor sets out to improve electric motors—and ends up with a fresh approach to auto transmissions.

By E. F. Lindsley

AUTOMATIC transmissions on cars work all right, but there are engineers who are not afraid to try for something better. Count among them Gerald Banning of Zilwaukee, Mich.

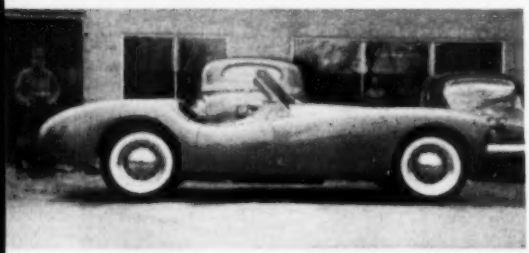
Most auto engineers still live by the old creed that "there's no substitute for inches." Which is another way of saying that even though an engine has plenty of horsepower, it won't satisfy most drivers unless it also puts out lusty torque at the low end of the curve. Which gets down to the fact that drivers want fast acceleration.

Since one of the easiest ways to get torque is with plenty of inches of piston displacement, big engines are bossing the American road—despite added fuel costs, extra weight and murderous top speeds. Smaller engines would do nearly as well if people didn't insist on a big twist on the drive shaft every time they wanted to take out in a hurry.

Gerald Banning claims to have the answer. After watching him put a gutted Jeep through its paces with nothing but a little air-cooled engine for muscle, I'm inclined to think he may be on his way.

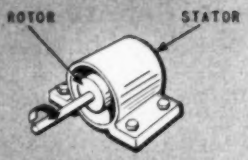
But Banning is an electrical man. Since boyhood he's been winding and repairing motors. He thinks in terms of starting and stopping big machine-shop planer motors, heavy elevators and ship's winches. Just to show what he could do, a couple of years back he built a sports car with an electrical drive.

For power, he used a little air-cooled gas engine that drove a generator. This furnished juice to a special electric motor connected to one rear wheel. With only 20 horsepower, Banning's sports



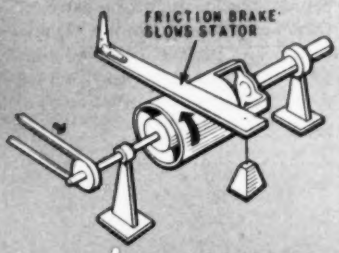
STRICTLY A STUNT, Banning's sports car isn't a speedster. But its electric motor-generator drive lets it develop enough torque from a 20-hp. engine to tow three huge trailer-trucks.

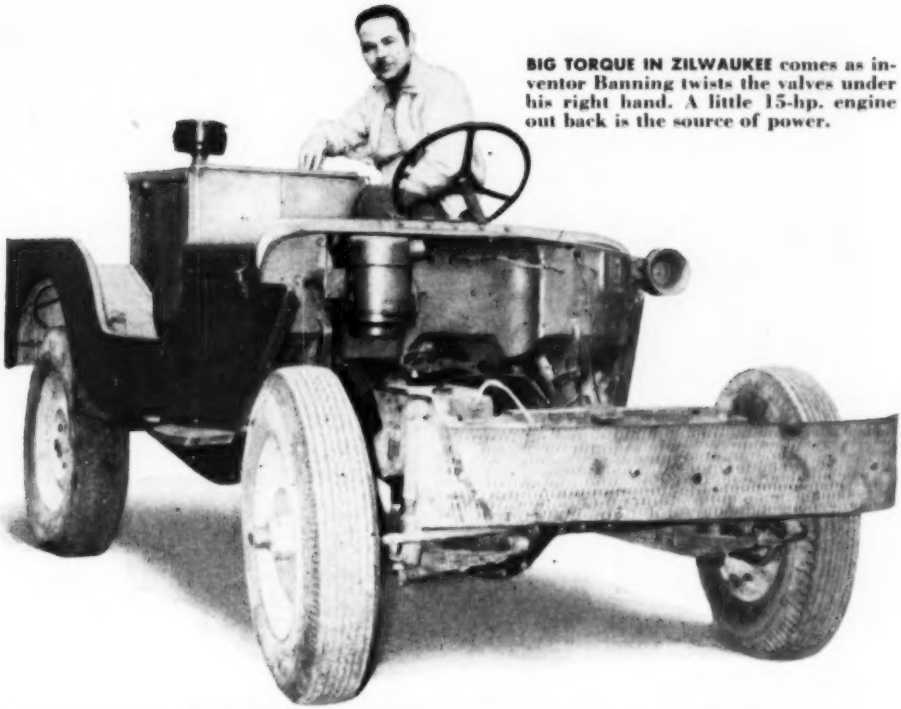
Torque Feedback



1 **Most AC motors** are comparatively weak when starting up, and develop full torque and power only at rated speed. (This is also true of gasoline engines.) Banning's idea is to use reaction torque to help out the start. When running, a motor that delivers 20 pound-feet, say, at the shaft is exerting this force relative to its fixed housing and stator.

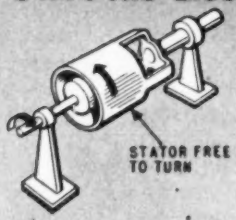
4 **If a friction brake** gradually slows down the stator, full motor torque is available to pick up the load. As shaft gets up to speed, the stator is brought to a stop.



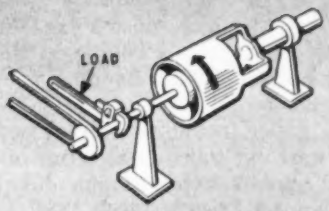


BIG TORQUE IN ZILWAUKEE comes as inventor Banning twists the valves under his right hand. A little 15-hp. engine out back is the source of power.

Helps Start His Electric Motors

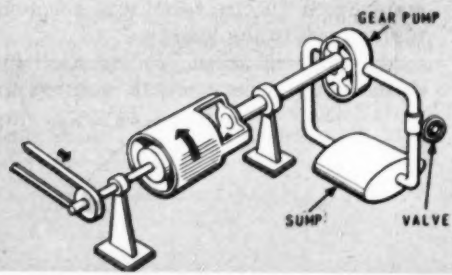


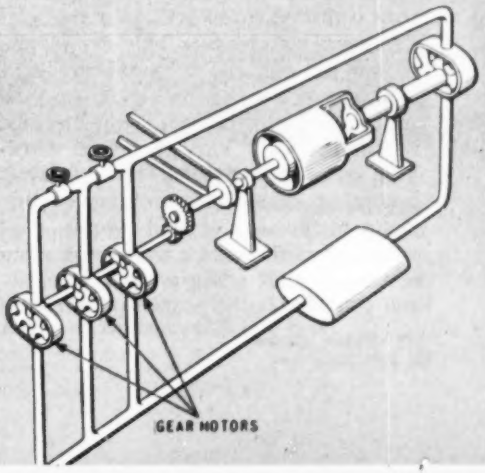
2 **Mount the housing** (stator) so that it can turn backward, and you get something like this. Either part can turn at full speed, or they can divide the total speed between them.



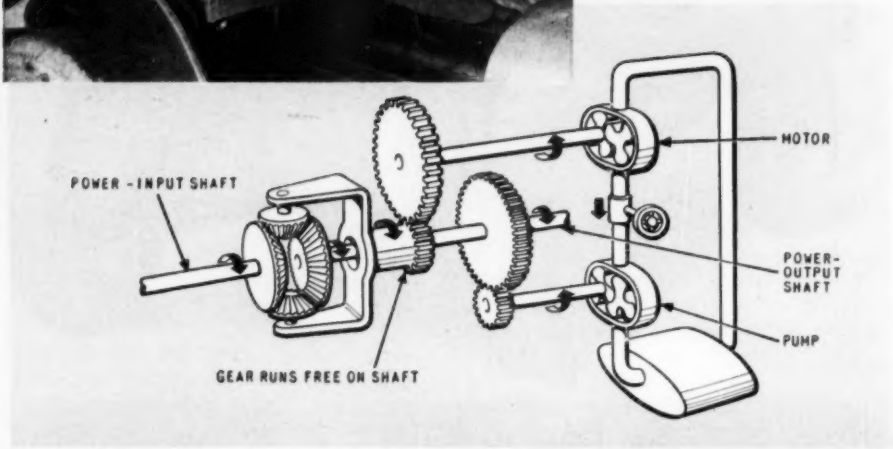
3 **With a heavy starting load** on the shaft, the rotor won't turn. But the stator can and will. When relative speed between them is motor's rated speed, full torque is available.

5 **Simple hydraulic brake** below achieves same effect if valve in circuit is gradually closed. But Banning's full rig, right, does not dissipate stator's energy against an inert valve. Instead, hydraulic pressure is led around and, by hydraulic motors, put to work at the task of bringing rotor up to speed.





NON-ELECTRIC TRANSMISSION is in big tank at rear of experimental Jeep (left). Small engine is in back; chain takes output down to drive shaft. Diagram below reveals similarity to electric-motor rig on previous page. Gear-and-pinion cage replaces the stator and rotor. Banning gets a torque multiplication of 5.4 to 1, compared with maximum of about 2.6 to 1 in auto torque converters.



car would scarcely dust a Jag. But by using the ingenious couple-up that he calls Polade Power, Banning got phenomenal torque.

It's easier to follow Banning's idea if you start out thinking in terms of electrical motors—even though his latest transmission, in the Jeep, hasn't anything electrical about it.

Low-Speed Torque Is Hard to Get

The fractional-horsepower motor that runs your bench saw will walk the blade through a two-by-four like cheese. But if you let just one tooth of the blade catch on the wood before you hit the starting switch, the motor stays stalled, the lights dim and the fuse blows. Your saw motor, then, has plenty of power at speed but nothing to brag about in the way of stall torque.

Magnify this picture to the size motor needed to start a big winch—or a car—and you can see the problem that electrical engineers have. For ruggedness and simplicity, nothing beats the AC induction motor. But to get low- or zero-speed torque, all sorts of complications are needed.

Banning must have mused on this problem a long time. When I met him he was unshaven from an all-night session in the shop. Nevertheless, all the concentrated drive of his restless inventor's mind seemed to leap across the desk as sketches by the dozen flowed from his pencil. Starting with the symbols for a rotating armature and its fixed surrounding stator, he pointed out that 20 pounds of torque at the shaft, say, meant an equal and opposite 20 pounds of reaction on the motor housing.

The entire purpose of his idea, he emphasized, is to feed this reaction torque back to the load.

My comment about "pulling itself by its bootstraps" was evidently not new to

[*Continued on page 278*]

Tire-Changing the Easy Way—with a Fork-Lift Truck

A FORK-LIFT truck hoisted the car for fast tire changes (above) when Chrysler copped the Stevens Trophy at Indianapolis Speedway. Setting a new stock-car track record, the New Yorker De Luxe averaged 89.89 m.p.h. for 2,157 miles in a 24-hour run.

Claims String-Saving Title

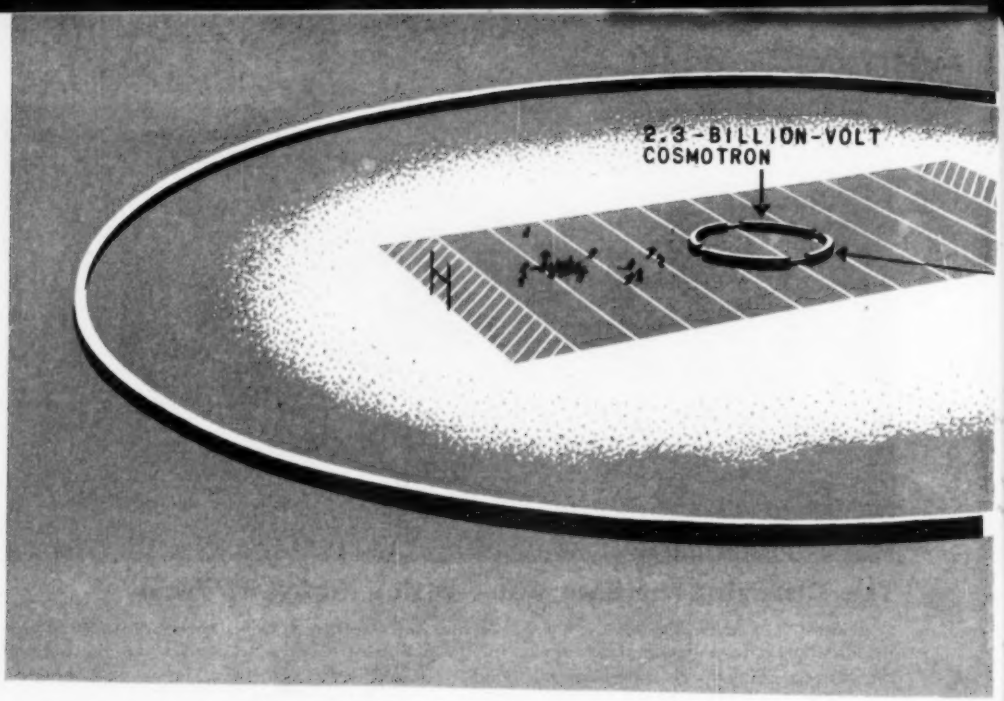
ED FOUTS of Columbus, Kan., began winding up bits and pieces of cord years ago and now claims to be the champion string saver of the world. He figures the whopping 660-pound ball on which he is sitting would unwind to stretch for 338 miles.

I.D. Badge Checks Radiation

A SINGLE badge protects the health of workers and safeguards plant security at Oak Ridge. X-ray film behind the identification picture records exposure to radiation and is checked weekly. As a new film pack is inserted (right), it ejects the old one.

Bridge Takes to the Road

THIS bridge on the move was salvaged by engineers building a new span at Solomon, Kan. After a 10-mile journey, it was anchored down at New Cambria—a town fresh out of bridges because the one there had been washed away in a flood.



Biggest Atom Smasher to Be So Large a Football Game Could Be Played Inside It

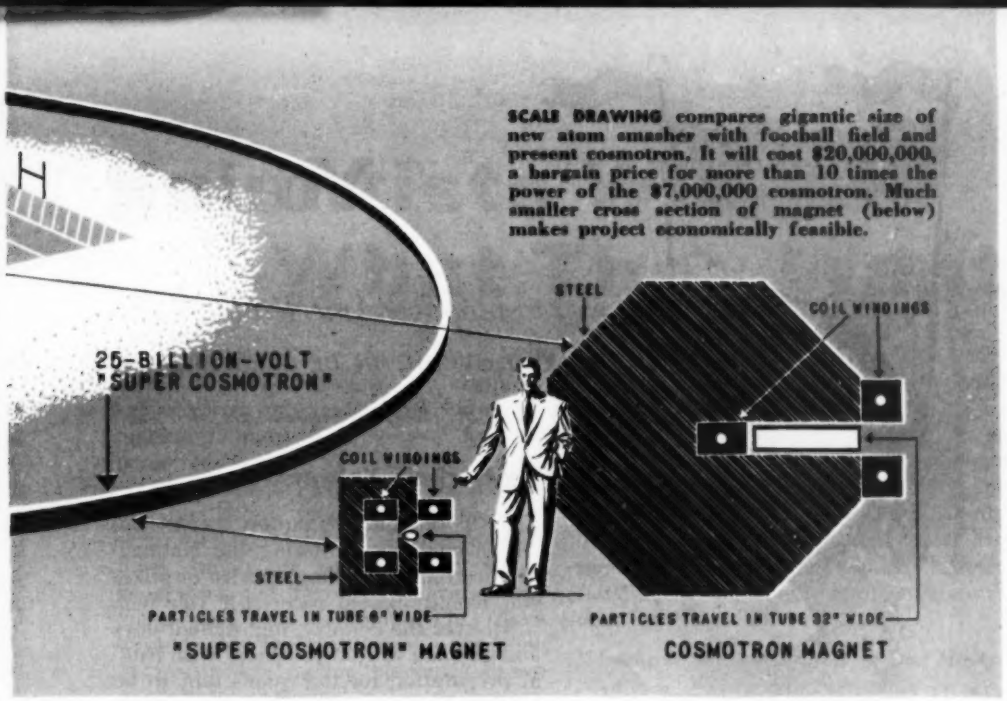
AN ATOM SMASHER 700 feet across and of record-breaking 25-billion-volt power will be built at Brookhaven National Laboratory, Upton, N. Y. Just approved by the Atomic Energy Commission, it should be completed

Family Car Is Lion Limousine

LIONS do like to get out and about—so Tex, pet of the Porter family of Hersher, Ill., enjoys riding with them in a station wagon adapted as a traveling cage. At home, for boarding and alighting, an outside runway leads from his living-room cage to the backed-up car. He's been as far as Florida in his limousine.

Rice-Hull Slab Defies Flame

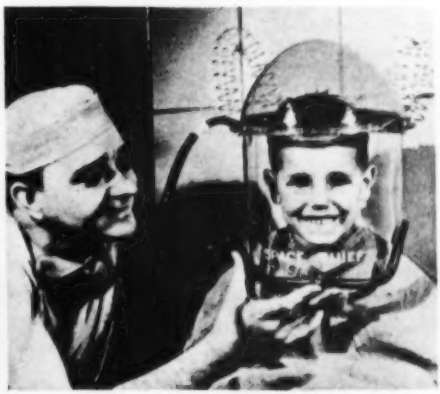
JUST a thin slab of a fireproofing material made from rice hulls serves (above) as an effective shield from an oxyacetylene torch's flame. Italian inventor Angelo Secondi, who calls the material Secondite, uses this test to demonstrate its fire-resistant and heat-insulating qualities. Wallboard and furniture, he says, can be made from it.



in five to six years. Its newly discovered strong-focusing principle permits its ring-shaped magnet to be of economically small cross section. Thus, only a quarter again as much steel will be needed over Brookhaven's present 75-foot, 2.3-billion-volt cosmotron—currently the world's most powerful atom smasher, though about to be surpassed by the University of California's five-to-seven-billion-volt bevatron.

Tailgate Aids Air-Sea Rescues

FISHING crashed pilots out of the drink will be easier from the Navy's new 52-m.p.h. Chris-Craft rescue boats. A ramp lowered from a self-bailing stern cockpit lets rescuers, standing at water level, pull injured airmen aboard without lifting them over the side. From the cockpit a door leads to a sick bay accommodating four.



Helmet Takes Tots to Dreamland

FOUR-YEAR-OLD Jimmy Bowden, about to lose his tonsils, grins from a "space helmet" that administers anesthetic at the Bethesda, Md., Naval Medical Center. Lt. J. G. Morrow (above) and Comdr. D. J. Giorgio devised it to allay children's fears of operations. Minus tonsils, Jimmy, its first user, agreed: "Pretty smart trick."

Young

Any red-blooded American boy can make a cyclotron or a jet engine, say these kids—and prove it!

By Herbert Yahraes

ONE of the pleasantest tasks connected with entering the National Science Fair is thinking up a list of prizes you would like to receive if you win.

All over the country, high-school boys and girls are working on such "wish lists" in preparation for this year's fair, to be held at Purdue University, May 13-15.

In other years, one teen-ager wished for a 50,000-volt transformer. Another

Scientists Win What They Want

asked for a typewriter with a chemical keyboard. A girl wanted most of all an unjointed human skeleton—a bag of bones costing $92.50.

Other students have wished for animal-breeding cages, spectrometers, barometers, oscilloscope kits, Geiger-Mueller tubes, binoculars, encyclopedias, signal generators, soil augers, slide rules, voltmeters and vacuum pumps. They have wished also for distillation apparatus, microscopes, refracting telescopes, sweep generators, analytical balances, terrariums, molecular-weight apparatus, cameras, radios and dissecting sets.

These wish lists are heartening evidence of the ability of our young folks to cope with the world they are growing up in. And the five-year-old National Science Fair, which makes the wishes come true for the winners, is a powerful institution for encouraging the development of this ability.

Entrants are limited to those secondary-school sophomores, juniors and seniors who have won first places in local fairs. This means that there will be about 100 finalists, 50 boys and 50 girls, at Purdue. But the National Fair is only the peak of a pyramid. At its base are some 50 city, state or regional science fairs, averaging hundreds of entries and drawing thousands of visitors.

Among National Resources: Young Minds

Last year the Washington, D. C., fair had 1,000 exhibits, culled from 4,000; Rhode Island had 1,150; St. Louis, 1,700. The Greater Kansas City Science Fair even had an entry from first-graders—about poultry families and their eggs.

"In the ranks of America's young scientists lies the greatest hope of security for the future," the Very Rev. Paul C. Reinert, S.J., distinguished scientist and president of St. Louis University, points

His $35 Nuclear Reactor Was a Hot Exhibit

Two governments helped Ed Richards of Belleville, Ill., win first place at the 1952 National Science Fair, held at the Smithsonian Institution, Washington, D.C. The U.S. Atomic Energy Commission permitted him to build an animated model of a nuclear reactor. The Canadian Atomic Energy Board allowed him to buy a quarter of a pound of uranium, so he could demonstrate how plutonium and radioactive isotopes are made.

out. "We need desperately an ever growing resource of scientific skill." By stimulating the scientific interest of thousands of youngsters every year, the fairs help provide this resource.

Local fairs are usually sponsored by a newspaper, working with a teachers' committee and frequently assisted by the region's colleges and industries. The national fair is a joint enterprise of the newspapers and of Science Clubs of America, the organization which also administers the annual Science Talent Search (PSM, Dec. '51, p. 144).

A Snooperscope Is Born

One night several years ago the Arthur Richards family of Belleville, Ill., was driving down the Inter-American Highway, in Mexico, with son Ed at the wheel. Suddenly the headlights picked up a herd of goats. Ed braked hard and just avoided a crash.

From this near accident, Ed, a high-school sophomore, plucked an idea for his exhibit at the Greater St. Louis Science Fair—a demonstration of the war-born snooperscope, or infrared converter tube. The device Ed built sent a beam of invisible light into the darkness and presented as a visible greenish image everything it picked up.

Ed's display won first awards at both the local and national fairs. Next year (1952) he came back with an even more complicated exhibit—an animated model of a nuclear reactor. Last year, instead of competing for national honors, Ed entered a special scholarship division of the St. Louis fair with an exhibition on radiocarbon dating. It won him a $4,000 scholarship.

Incidentally, Ed was no lab-bound scientist, but took an active interest in track, wrestling, band, dramatics, and Boy Scout and church work. Practically all of the exhibitors at all the national fairs have been active in such affairs.

Like Ed's nuclear reactor, many of the exhibits betoken a surprising amount of scientific knowledge and of research skill. For example, a Bluffton, Ind., high-school senior, David Michael Young, conducted experiments on rabbits to determine the pressure at which vesico-ureteral regurgitation occurs. This is backflow from the bladder, and it may result in kidney disease. X-ray photographs of the results formed the central part of Mike's exhibit. It won him a first place last spring in the national fair, and last fall he entered Indiana University to make medical research his career.

Her Idea Was So Good She Plans to Patent It

ELIGIBLE to compete for her third National Science Fair this year, Doris Jean Hermes of Martinsville, Va., may become its first three-time winner. Daughter of a textile expert, in 1952 she got a prize for a display of acetate and viscose rayon printed by a method she developed.

Last year she won another prize, by demonstrating a simplified way to dye Orlon. The textile industry is interested and Doris is seeking a patent.

Stewart Tanner Traill of Bethlehem, Pa., built a cyclotron, an atom-smashing machine. Some of his advisers told him the job was too big, but with the help of physicists from several universities and gifts from a number of manufacturers—including a 775-pound specially machined piece of steel for the magnet—he did it in 1,000 hours.

Larry Collins, who had a part-time job in an Oklahoma City radio-repair shop, actually built a TV color camera and receiver. The two together cost him $200 and two years' work.

Elton Stubblefield of Denton, Tex., studied cancer in tropical fish and took motion pictures of them in color.

Another photographer, an Ohio boy, was fascinated in school by so-called time-lapse movies, in which you can apparently watch a plant grow. He asked about the process to see if he could make the movies himself. The extra equipment, he was informed, would cost $188. So he constructed his own apparatus and set his camera to take a picture of a seedling every five minutes. The movie became his exhibit.

White Mice and a Rocket to the Moon

Harry Eichelberger of Lexington, Va., found that not much was known about the parasites of mice. So he trapped white-footed mice and studied their fleas, ticks and mites. Peggy Lenderking of Martinsville, Va., exhibited dandelion cigarettes. LaMar Betz of Quakertown, Pa., built a 12-foot cutaway model of a rocket to the moon. Pete Miller, son of a St. Paul, Minn., barber, collected fossils and put them on display with the equipment and books used in classifying them. Helene McFetridge of Philadelphia built her own violin, to demonstrate the laws of vibrating strings.

"That Boy Is a Genius," Said One of His Judges

At the Washington, D. C., science fair two years ago, James Brent won first place and the lavish praise of the judges for his exhibit of jet, rocket and steam engines, and a model car capable of going 110 m.p.h. That made him a national finalist. But he had been in military service, was older than his schoolmates and had a wife and child to support. When Howard University offered him a job as a mechanic, Jim quit school.

Pains Taken with Peppers Paid Off in College

Mary Helen Martin of College Park, Md., is now studying biology on a scholarship at Cornell. She got her start with a biological exhibit that won her a first prize in the 1951 National Science Fair. It was a demonstration of the results of her efforts to cross a pimento with a California wonder pepper, in the course of which she had germinated 180,000 seeds and found 466 twins. She treated sterile twins with a drug, got fertile fruit.

Visitors to the 1950 fair could study the internal structure of the earthworm, on view in a papier-mâché model. In 1952 they could consider the similarities between the skeletons of man and animals—with ribbons running from a dog skeleton to a big drawing of a human skeleton on all fours. Last year, visitors could turn a crank and see how the human heart operates.

Other exhibits have shown the effect of radiation on fruit flies, the mathematics of the suspension bridge, the development of the chicken embryo, the workings of 3-D cinema, astronomical photography with a homemade telescope, and a model of a sewage-treatment plant. They have also shown how to produce camphor, chromium, chlorophyll and cosmetics, and how to get molasses from wood.

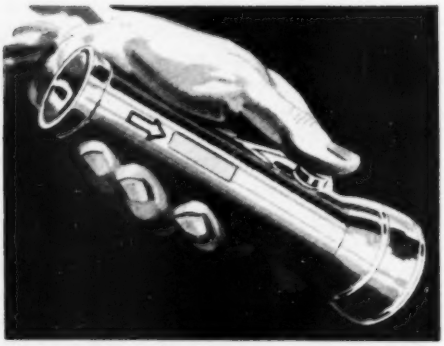
Penicillin from a Coffee Pot

Many of the youngsters use simple, close-to-home materials for exhibits that win them trips to the national fair.

Jim McMechan of Independence, Mo., brewed some of his father's tobacco in his mother's glass coffee pot and got a nicotine solution. Before he could begin experimenting with it, mold formed. Thereupon he dropped his interest in nicotine and worked up an exhibit on molds. Its high point was the production of penicillin.

[*Continued on page 258*]

I'd Like to see them make...



DRY BATTERIES that would give warning when about spent. A color-changing indicator behind a window in the zinc jacket would do the job.—*Ayoub Khoury, Latakia, Syria.*

A PULLEY-LINE MOTOR to make handling a heavy wash easier. A hand-set lever could adjust the mechanism to haul out or run in the line.—*Vera J. Stecher, Albany, N. Y.*

A WEED-KILLING HOE. A trigger-operated pump in the handle would feed chemicals through a vent to kill roots of chopped-off weeds.—*A. H. Waychoff, Phoenix, Ariz.*

A WHEELBARROW with wheel farther back beneath the tray so large loads would be more evenly balanced and moved with less effort. —*R. S. Craggs, West Hill, Ont., Canada.*

A CAR HOLDUP ALARM that could be set off from the driver's seat. Location of switch would be concealed so gunman could not turn it off.—*George Walton, Pasadena, Calif.*

Everyone has his own pet idea of a gadget he would like to see in general use. The five ideas illustrated above were suggested by PSM readers. What is YOURS? We will pay $5 for each one published. Please use government postcards only. Contributions cannot be acknowledged or returned.

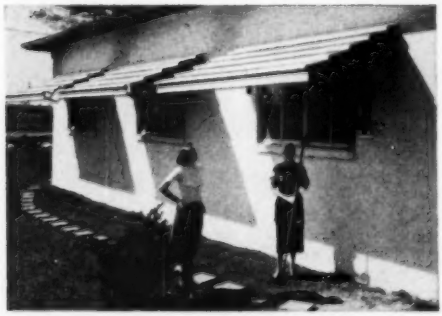
RECORDING THE YELPS of a cornering tire (right), a Goodrich engineer adjusts the mike of a tape recorder.

Rubber Knobs Squelch the Squeal in Tires

TIRES squeal when a car rounds a corner because their tread ribs are shuddering from being wiped sideways across the pavement.

In recent years, while cars have tended to become steadily heavier in the front end and power steering has made cornering easier, tire yelps have been louder than ever before.

Now two leading tire manufacturers have nearly stifled the squeals. Goodrich and Firestone have molded semicircular rubber knobs into the gutters between tread ribs. These knobs steady the ribs under side pressure and keep them from vibrating noisily.



Motor Flexes Metal Awnings

THE new aluminum awnings above can be extended or retracted at the push of a button. The panels of each awning are attached to pantographic arms. The arms are flexed by a 1/20-horsepower motor, with gear reduction of 600 to 1, which operates a camshaft arrangement.

Refrigerator Has Door Tap

IF SISTER works up a powerful thirst and keeps coming around for another drink of ice water, the mother above doesn't have to open her refrigerator repeatedly. Instead, because it is a new Crosley Shelvador, she gets her daughter a refill by simply pushing the button of a door tap.

Stilts Get New Look, New Jobs

ONE morning some three years ago a crew of lathers arrived on the job in Phoenix, Ariz., without their scaffolding. Someone had forgotten to bring it. Then and there a new industry was born, and you would never guess what:

It's making stilts! More than 80,000 pairs of the things have been manufactured, and 20,000 more are on order.

The lathers who forgot their scaffolding were headed by a chap named Bob Skaggs. Bob figured that he could waste two hours going back to the plant for it, or he could improvise.

He improvised. He searched through lumber scrap until he found some wood suitable for makeshift stilts. With them, the lathing job was finished on schedule, in time for the plasterers. That night he told his partner and brother, Everett, about it. Everett added his own idea.

Result: Skaggs aluminum stilts—now used not only by lathers and plasterers but also by carpenters, masons, electricians, decorators and homeowners.

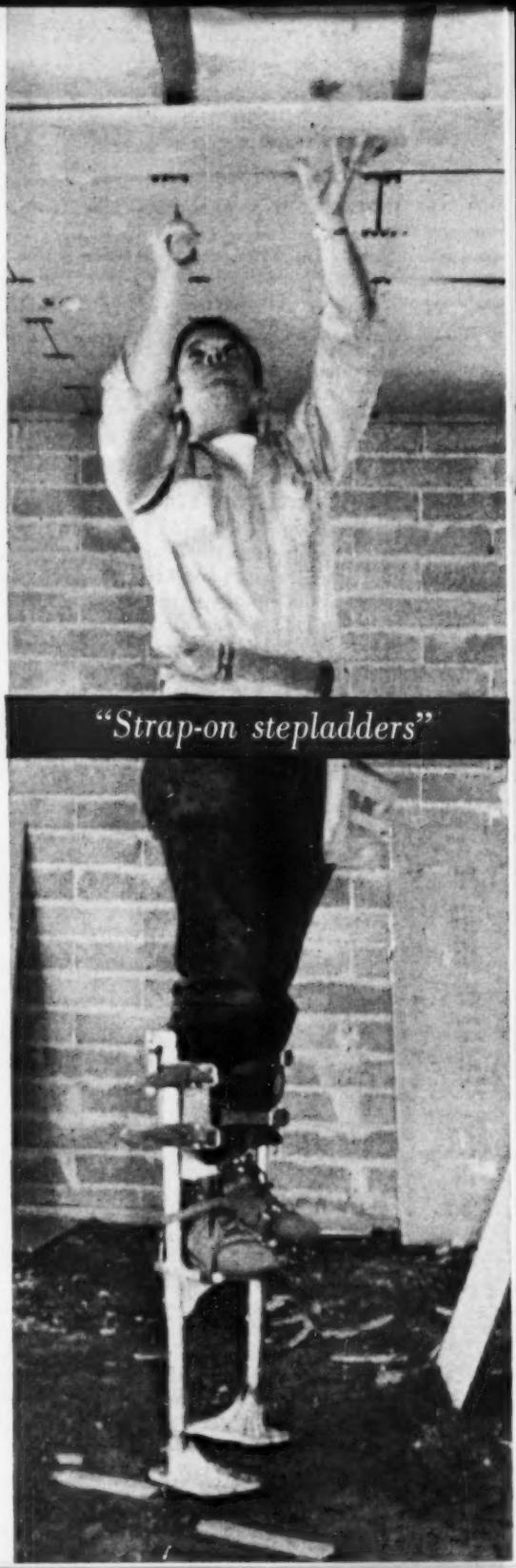
Stilts save time. Putting up scaffolding sometimes takes hours; stilts can be buckled on in less than a minute.

Small Fry Like Them, Too

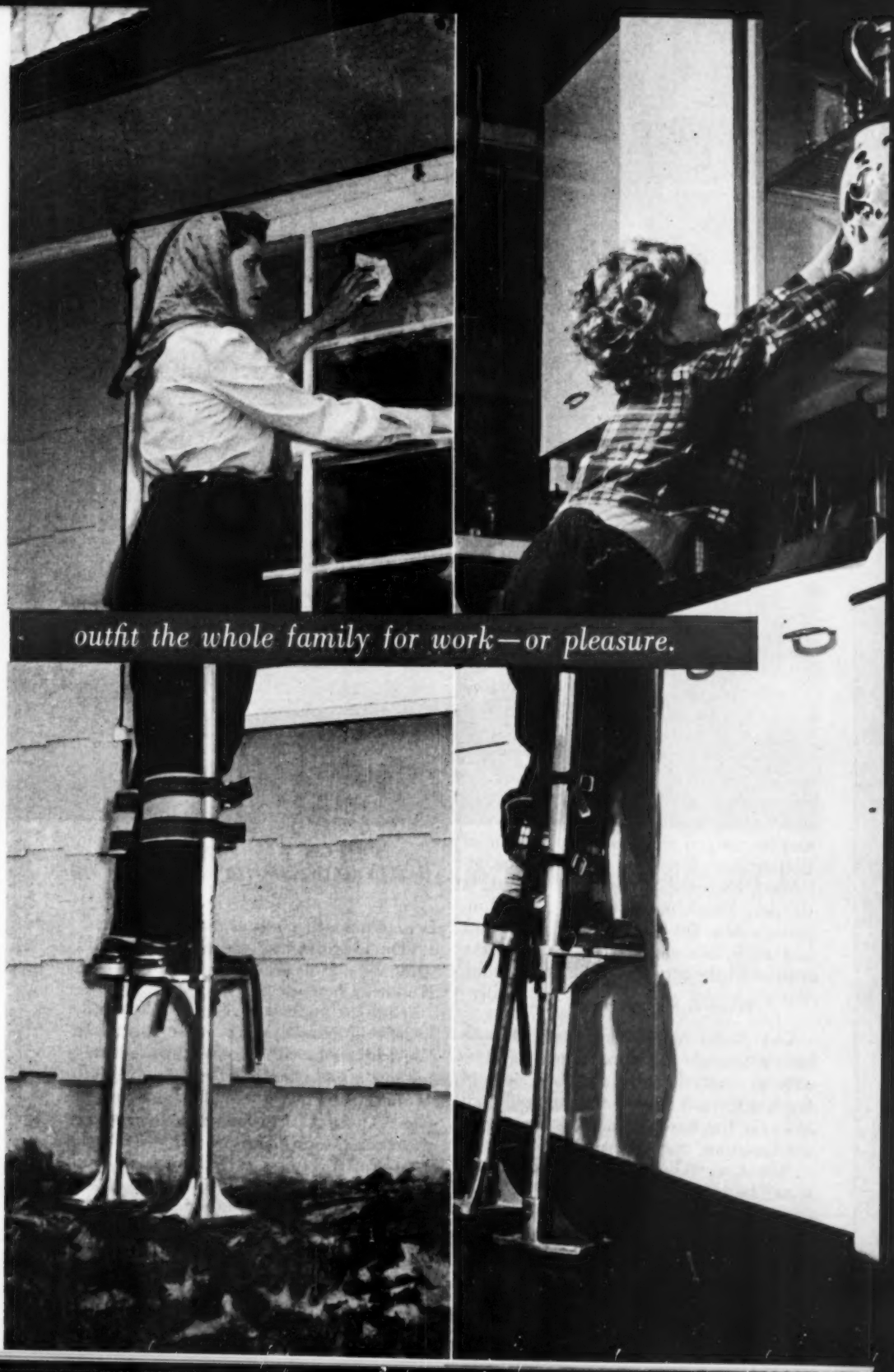
Homeowners are using Skaggs stilts for painting, cleaning out eaves, window washing and wallpapering.

Once stilts for adults caught on, smaller ones for Junior were inevitable. Stilts for the small fry were a sort of happenstance too. Everett Skaggs' three-and-a-half-year-old daughter began pestering her dad for stilts. He made some for her. You can guess what that did to the neighborhood children.

So the Skaggses started making kids' stilts. Currently, the little stilts are outselling the big ones. END



"Strap-on stepladders"



outfit the whole family for work—or pleasure.

Gus Defies the Elements

By Martin Bunn

BLACK thunderheads were piling up on the horizon, blotting out the late sun of an April afternoon, as Gus Wilson tossed his tool kit into the back seat.

He wished he could send Stan Hicks, his young helper, on what promised to be a routine but uncomfortable job: a truck stalled in the hills with ignition trouble. But Art Robler's truck line was a new outfit in town and a prospect for considerable steady business. Gus wanted the Model Garage to make a good first impression.

He drove with a wary eye on the sky. Outside of town, a sudden torrent of wind-driven rain lashed across the windshield. Gus finally came down into the narrow canyon that held the torrent of Rolling Rock Creek, to find the truck, attended by one of Robler's drivers, a slender, youthful fellow in wet dungarees. The front wheels of the truck had sunk into the soft shoulder of the road until the pan rested on the ground.

Truck Is Still Partly on Road

Gus found himself regretting that he hadn't brought his tow truck, until he noticed that the dual rear wheels of the truck were still on the road. They'd have no trouble backing the outfit onto the highway, once the motor was fixed.

"I'm Gus Wilson of the Model Garage," he told the driver as he got out of his car, tool kit in hand. "Robler phoned me that you were having trouble up here. Looks like a nice day for ducks."

The truck driver was hanging on to Gus's arm, shaking it. "We've got to get out of here!" he cried.

With flood water swirling at

"Ducks is right," the driver agreed, grinning. "Holloway's the name—Steve Holloway."

"Glad to know you, Steve," Gus said heartily. "Now what's your trouble? We'd better move fast; this storm's turning into a real cloudburst."

"Nothing much wrong," Steve assured Gus. "The stud that holds the distributor shaft came loose, and the thing worked up out of gear. I tried to put it back but didn't have much luck."

"We'll fix that in a hurry," Gus said, lifting one side of the hood and placing

his feet, Gus finds a magic wand in his own tool kit.

it on his broad back to shield the ignition wires from the rain while he peered at the motor.

This was going to be easy, Gus told himself. The driver had pulled the distributor, shaft and gear completely out of its recess hole in the block, first disconnecting the attached automatic spark vacuum-control tubing. Gus thrust his screwdriver blade into the flywheel-timing hole, prying the flywheel around by its teeth until No. 1 firing indicator showed, so that he could time the motor quickly when he shoved the distributor back in gear. Below the gear there was a keyway that slipped into a key on the oil pump below. All he had to do, Gus thought, was to drop the shaft back in with the gear set for No. 1 firing, wiggle it to engage key and keyway, and put the retaining stud back in.

Such retaining studs normally had short-coiled springs, held down under a flat washer, so that the distributor could move back and forth in the retaining-stud slot, for manual spark control. Before attempting to put the distributor shaft back in its foot-deep, inch-wide recess hole, Gus used his pencil light to look for the five-sixteenths retaining

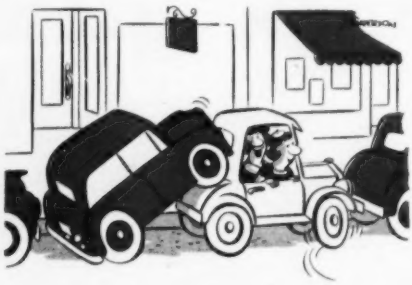
stud and its spring, hoping to find them lying on the splash shield.

He quickly found the stud, its washer still on it, but couldn't locate the spring. Oh, well, he thought, he'd just put on a lock washer and lock the distributor in advanced-spark position.

Assembly Won't Go Down

Gus picked up distributor and shaft, attempted to thrust it down in and seat it. But the assembly wouldn't go fully down on its seat on the crankcase. The shaft had a resilient, springy feel. The thought came to Gus that he had located the missing spring. Sure as shooting, it had dropped down into the shaft hole when the driver had lifted out the assembly.

"How're you coming?" Steve Holloway yelled above the drumming rain.



"For a minute I thought this space wasn't gonna be big enough!"

"Not so good," Gus shouted back. "A little spring has dropped down there on top of the pump shaft. I've got to get it out some way."

Gus backed out from beneath the hood to stand in thought beside the truck. His eyes moved to the waters of Rolling Rock Creek, which were rapidly rising to an angry, raging torrent with the rain.

If it was raining this hard here, Gus knew it was probably coming down in solid sheets higher up. The creek would be over its banks in 10 minutes. There was plenty of loose timber slash above, from logging operations, that would come drifting down like battering rams. If they were still here then, anything could happen, with the truck so close to the stream bank.

Even as Gus stood there, he saw a tangle of driftwood come down the white-maned stream with the speed of an express train. Cold chills ran up his spine as he turned his attention back to the disabled truck.

He grabbed a long-shafted screwdriver and began probing for the offending spring. If it were standing on end, he thought, he could get the driver blade inside it, and by side pressure ride it up to the top.

Or if it were on its side, he could just poke the screwdriver blade between its coils and lift it out.

It sounded easy, but it wasn't. The spring was lying on its side but fitted so closely in the bottom of the distributor-shaft hole that when Gus drove the screwdriver blade between the coils, the spring opened to wedge tightly against the recess walls. He tried to turn it with the end of the driver blade, and found that he couldn't. It was an exasperating deal. He worked carefully and slowly, fighting rising apprehension.

A low rumble started up the creek, gaining in crescendo, and the ground beneath Gus's feet shuddered. The big, round boulders at the creek bottom were being rolled thunderously by the rapidly rising water. Great fallen logs came down, creating dams in the narrow canyon that flooded the road. He had seen this spot where they now stood, Gus thought, running four feet deep with water and whirling driftage. Nearly every year the highway crew had to come out and clear it after the flood receded.

Holloway Warns Gus

Gus felt cold water run over the tops of his shoes, and he jerked his body from under the truck hood just as the driver catapulted from the cab where he had taken shelter and grasped Gus's arm.

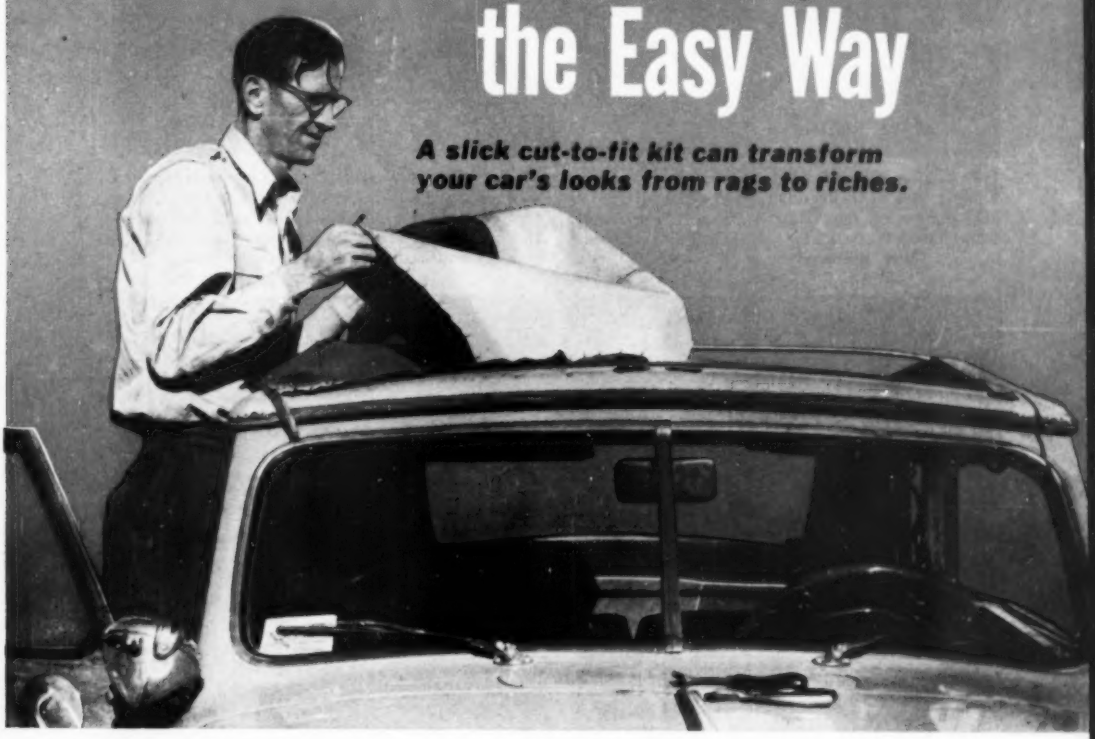
"We'd better be getting out of here before we get drowned," he shouted. "Water's coming up over the road. A log . . ."

[*Continued on page 260*]

It's a One-Day Job

Retopping a Convertible the Easy Way

A slick cut-to-fit kit can transform your car's looks from rags to riches.



By Bob Gilmore

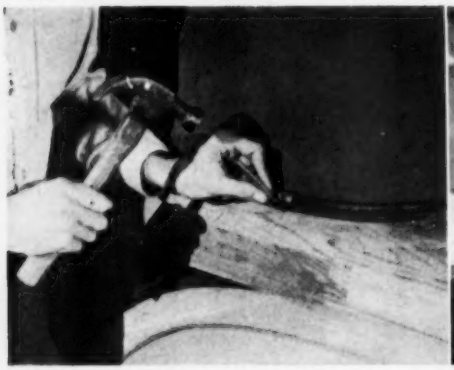
IF YOUR convertible needs a new top, you can get it in one of three ways. The executive way: Have your secretary ask a garage to pick up the car, retop it and bring it back tomorrow. The hard way: Use the old sagging top as a pattern, overwork the family sewing machine stitching seams in heavy material, then tug and try to make it fit. The smart way: Buy a ready-cut kit.

You can get a kit for your make and model (for MGs too) from an auto-parts store or right out of a mail-order catalogue. All the work of cutting, sewing, binding and snap fitting has been done, leaving you little to do but tack it in place.

When ordering, be sure to give the year, make and model number of your car. Specify color from a choice of tans, greens, black or natural, and indicate the grade of double- or triple-ply cotton fabric you want, or choose a vinyl-impregnated fabric for a few dollars more. You can alter the styling of your car somewhat and improve your rear visibility by ordering a full-width rear window. If your car is a '48 model or newer, you have plenty of styles and fabrics to choose from.

To see how to take off the old top and put on the new, please turn the page.

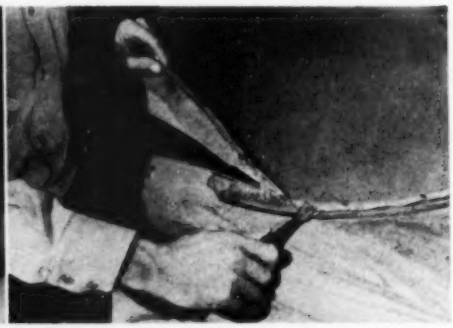
Off with the Old Top . . . . . .



1 Before stripping old top off, mark location of screws in welt ends, position of side seams and center of rear flaps. Use punch to mark wood body, but stick little triangles of masking tape at these points if body is metal.

2 Spread welt apart and pry upholsterer's tacks out with a screwdriver. Usually, after a foot or so of the welt has been freed, the rest of the piece, including tacks, can be pulled up quickly and easily with a few sharp yanks.

3 Metal trim strip is sometimes used instead of welt. Pry it up with firm pressure of screwdriver. Strip is C-shaped and is only snapped over backing strip on sides of body. Remove screws holding strip over fabric.



4 Pull last few tacks remaining under welt with claw tack puller. Screwdriver would do, but one slip might spoil your car's paint job. Gather up the tacks as you pull them—they'll be picked up by your tires if you don't.

5 Pull side-window weather-strip gasket out of its metal retaining frame and remove screws that hold frame over top flap. Finally, free old fabric by pulling out tacks in welt over windshield. Leave the side pads in place unless rotted or mildewed. If they must be replaced, your kit dealer sells them, too. Leave the old pad on one side while installing the new one opposite, to maintain original spacing of bows in the top frame.

6 Set old window in new rear flap as first step in preparing new top for installation. Get its position from the old piece, or follow the marks usually found on kit material. Trim excess fabric with a razor blade after framing the glass. Skip this step if you've ordered a full-width plastic flap with your retopping kit.

7 Snap the flap in place on original fastenings under the rear bow. Line up the center with mark previously made on body and tack the bottom in place, working outward from the center. The small piece held on each side of the flap by zipper is tacked at top and bottom to support flap and seal out drafts.

8 Trim off excess material along the flap bottom with a razor blade, cutting close to the tacks so the new welt will cover tacks and edge of fabric. Use tacks generously, spacing them about an inch apart to prevent slack spots and wrinkles later when the fabric is tight.

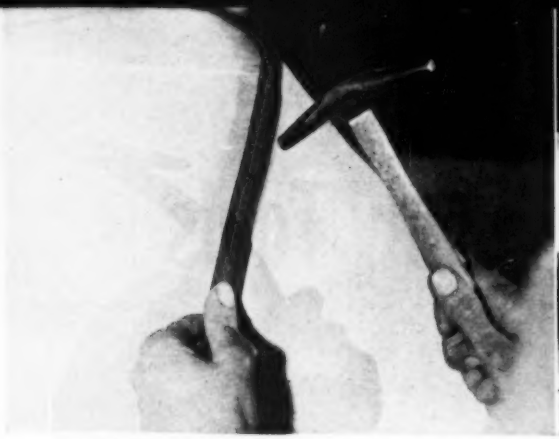
9 Spread new top over bows, then fasten the side snaps to original fastenings on side of body. Adjust the top so both sides are smooth and top is even across rear bow. Fit the sides around curve to meet rear flap by cutting (arrow) until fabric curves smoothly.

Please turn the page for more retopping photos.

10 **Tack narrow rain flap** across the rear bow so that it lies over the rear-window flap to keep rain from blowing in. Start tacking at the center and work out to sides, driving tacks only part way in until you see that the flap will be straight. Pull out and reset tacks if necessary.

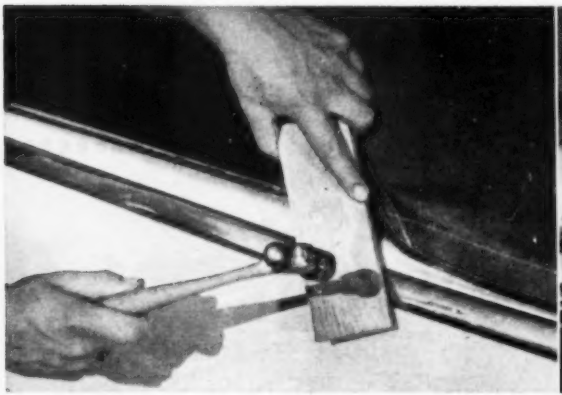
11 **Tack main top panel** over rain flap on the rear bow. This panel is stitched to sides from front to back, but several inches at rear are left unstitched for adjusting fit. Drive tacks in straight line and trim fabric close to them for easy and neat covering with welt.

12 **Now go to front** and pull top smooth for tacking forward edge. Don't stretch the fabric too tight—a few wrinkles will shrink out later. Align seam ends (arrow) with marks made on body before removing old top. They should be equidistant from windshield center.



13 **Look the job over** at this point and pull a tack here and there if necessary to get a perfect fit. Then drive all tacks home and attach welt across rear bow to cover tacks and cuts made earlier when fitting sides. Welt folds over itself to hide the tack heads.

14 **Tack or cement side flaps** to the rear quarter frame on each side. These flaps pull top smooth at sides, so adjust carefully before tacking. Screw retainers for window gaskets over flaps and trim fabric even with inside edge. Snap rubber gasket in place.



15 **Replace trim strip** or welt where top joins body. Screw strip in original position over fabric at rear. Then snap the side sections to the backing strips with smart blows of a hammer against a block of wood to keep from denting the metal. Now only the front is left.

16 **Complete the job** by tacking down front of top at corners. Fit fabric to the corners by slashing and folding it over itself. Tack and cover with welt across entire front edge. Screw decorative metal points over the welt ends—and the job is finished, ready for use. **END**

Care Extends Life of Top

DUST and dirt can wear a top thin in spots by abrasive action. Vacuum it occasionally and wash it when it's dirty. Clear waterproofing solutions can be brushed onto a leaky top, and there are dyes and canvas paints that will freshen up faded fabric. Best way to get an even application is to spray it on, but circular sweeps with a scrub brush will minimize lap marks. Small rips or worn spots can be patched with a press-on tape made for convertible tops. Back up the spot with a board and stick the patch on with a hot iron.

More Power to Your Shop:

How to Run Many Tools With One Motor

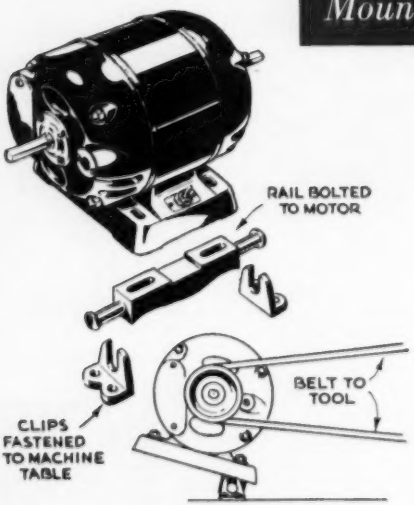
Bulb-snatching may be naughty, but motor-snatching isn't. It is a fine way to stretch a buck when a power-tool workshop is growing.

By Harry Walton

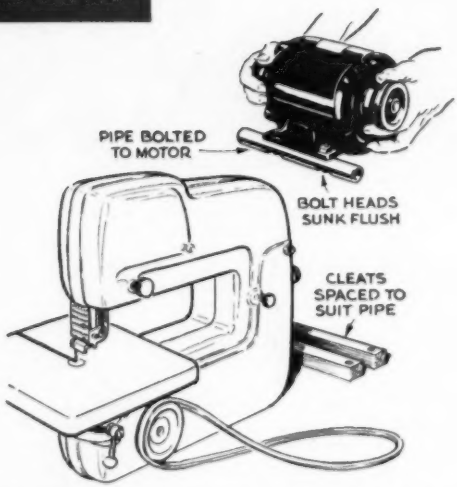
SOMETIMES a workshop budget will stretch to buy a new power tool but threaten to snap under the price of an extra motor. Shifting a motor from tool to tool is one answer, and with the right setup a very practical one.

Here are installation dodges that make the change-over so quick and easy you won't be tempted to do without a machine rather than make the shift. Drop-in mounts let you

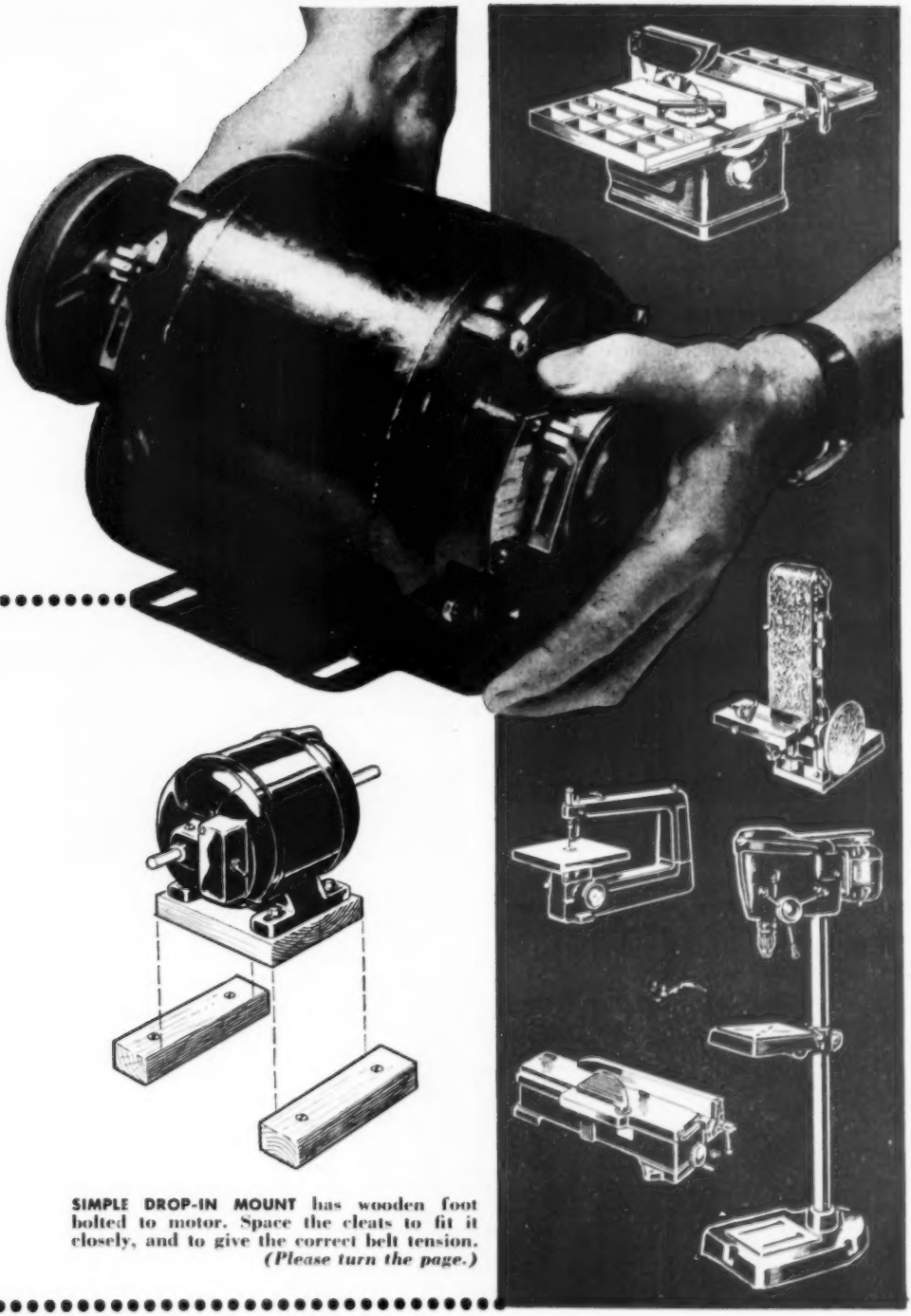
Three Ways to Mount a Motor



RAIL ON MOTOR and clips at each machine make it easy to lift power unit off one and drop it in driving position at another. These mounts can be bought ready-made. Overhanging motor weight keeps belt taut. Install so that motor tilt is well above the horizontal. If motor hangs almost flat, toggle action puts excessive strain on belt and bearings.



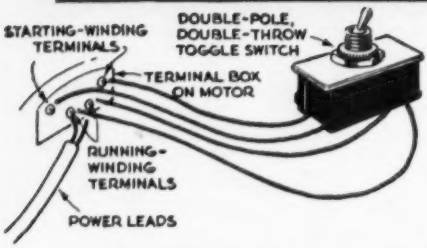
HOMEMADE MOUNT consists of a piece of pipe bolted to the motor base. This drops between a pair of cleats fastened near each machine in such a position that the motor tilts back away from it. A second pipe can be bolted to the other end of the base if the motor is to be turned end for end in some locations so that rotation can be reversed.



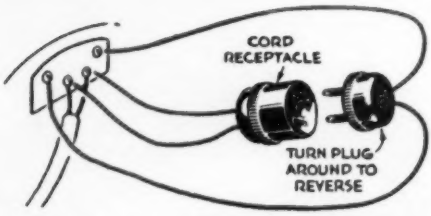
SIMPLE DROP-IN MOUNT has wooden foot bolted to motor. Space the cleats to fit it closely, and to give the correct belt tension.

(Please turn the page.)

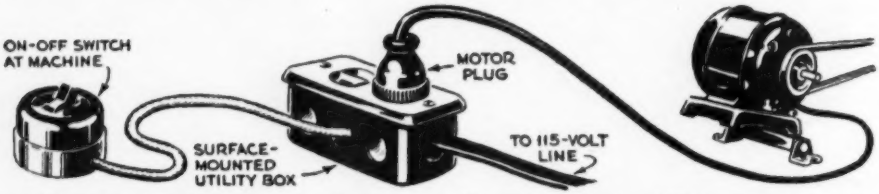
Wiring Rigs to Simplify Motor Control



MOTOR CAN BE REVERSED with a toggle switch wired like this. It should be a spring type with no center "off" position; a separate on-off switch should be wired into the power leads. Commercial reversing switches sold for power-tool motors include on-off function.

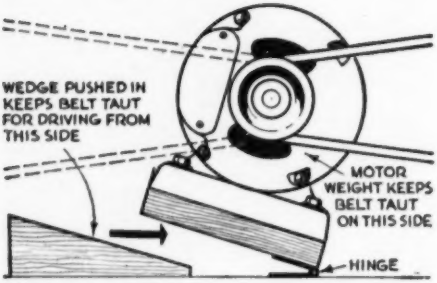


A PLUG-IN RECEPTACLE and a common plug can be used for reversing a motor as above. To change rotation, pull out the plug, turn it halfway around and reinsert it. Be sure to use a separate on-off switch. Never leave the plug out of the receptacle.



SWITCH AND RECEPTACLE permanently mounted at each machine provide handy power source and control of interchangeable motor. Motor is easier to shift because it requires only a short cord and plug of its own. It is also safer to have switch in a fixed position.

How One Motor Runs Two Power Tools



HINGED MOUNT allows a motor to run either of two machines at full power without drag of second one. Motor weight keeps belt taut for driving on hinge side as shown. To run second machine, motor is tilted up, belt is shifted, and a wedge is pushed under the free side. Change takes 20 seconds.

do it in seconds. The tilt feature facilitates putting on the belt—no need to force it over a pulley rim.

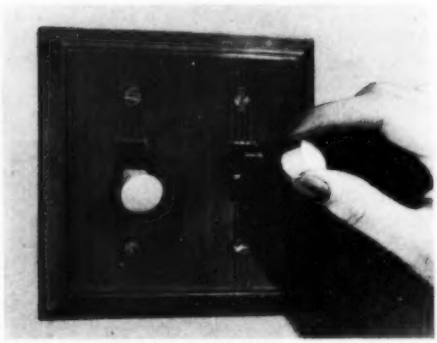
A two- or three-step motor pulley will give you a choice of drive ratios to suit various machines. Properly installed, the tilting mounts shown let a motor be shifted sideways, aligning any pulley step.

When motor rotation must be reversed, you can sometimes simply turn the motor end for end. Where this won't do because the motor would overhang its support or interfere with other equipment, the day may be saved if the shaft is double-ended. Simply put a pulley on the other shaft end.

But sometimes a motor must be reversed electrically. To do this, the relationship between the starting and running windings of an AC motor must be reversed. The instructions with a new motor will usually identify the four winding leads and show how to reconnect them to change rotation. The switch can be mounted on the motor, possibly on the terminal-box plate. If in doubt, have an electrician do the job. END

New for the Handy Man

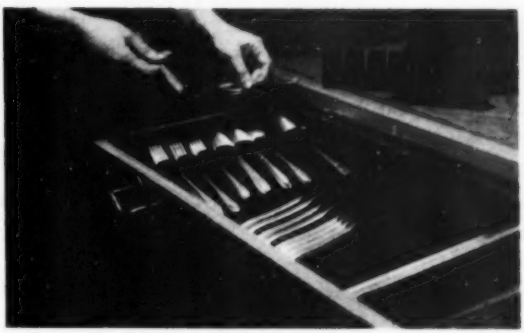
1. Rig Holds Storm Windows. With this extra "hand," heavy storm windows and screens can be put up or taken down quickly. The lightweight aluminum frame rests against the house and supports the outer end of the window or screen, making sure that it can't slip or be blown from your hands.



2. Switches Glow in Dark. Press these caps over your light switches and you'll have no trouble finding them at night. The plastic caps contain a luminous compound.

3. Blade Holder Adjusts for Depth. This plastic scraper is a knife, too. It locks a razor blade so that it sticks out just enough to make the depth of cut desired.

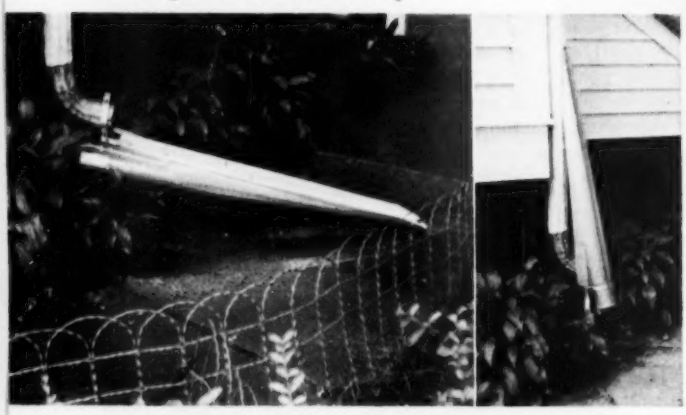
4. Kit Makes Silver Drawer. Any ordinary drawer can be quickly converted to a tarnish-proof compartment for silverware. A kit to do the job includes a chemically treated cloth for the bottom of the drawer, a cover cloth and several slotted silver holders that are arranged as desired and screwed in place. Four kits are available containing different-size cloths and from two to six holders, to accommodate from 108 to 420 pieces.

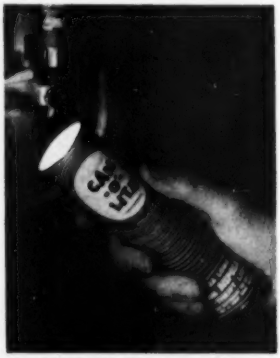


Please turn the page for more handy-man news.

5. Asphalt Looks Like Flagstone. You can now put down an asphalt-tile floor that has the irregular, random pattern of flagstone. A gray background grid is first cemented in place, then the varicolored, odd-shaped tiles are fitted into the spaces like pieces in a puzzle. Three different color combinations are available.

6. Rain Works Drainspout. This extension arm for a drainspout helps carry water away from a house when it rains, then automatically folds up when the rain stops, keeping paths, patios and play areas free from obstruction. Delicately balanced by counterweights, the spout is forced down by the flow of rain water, then pulled back up by the weights when the flow stops.





7. Flashlight Is Disposable. When this inexpensive flashlight burns out, you just throw it away and buy a new one. Essentially one big battery with a bulb on top, it will burn for five minutes a day for approximately 130 days.

Further information on the products described on this and the preceding page can be obtained from: 1. Pre-Tested Products Co., 17 Guilford Ave., Baltimore 2, Md.; 2. Sani-Speed Mfg. Co., 1364 E. 47 St., Cleveland 3, Ohio; 3. Ambi Corp., Box 39, Whitestone 57, N.Y.; 4. California Ways, 261 B St., San Mateo, Calif.; 5. Armstrong Cork Co., Lancaster, Pa.; 6. Crawford Co., Rock Island, Ill.; 7. Standard Supply Co., Box 281, Ashland, Ohio.

How to Build A Roadside Wash-Up Kit

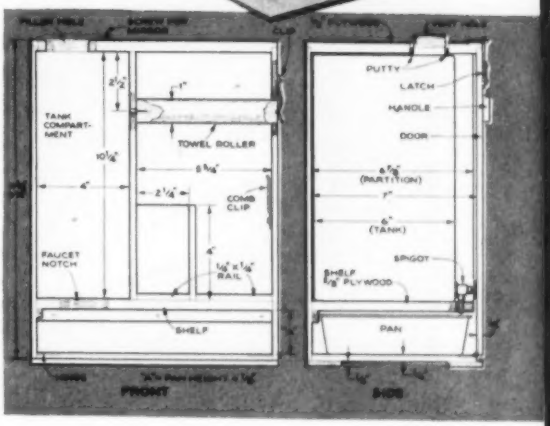
Carried in the trunk of your car, it will enable you to come away clean from the messiest jobs.

By Walter E. Burton

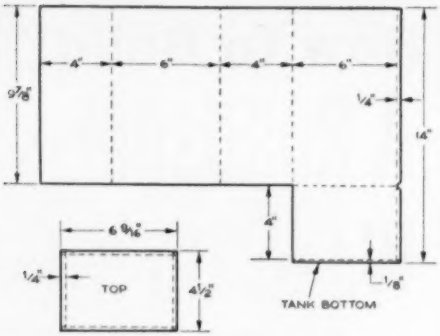
UNTIL washrooms are built into automobiles, this little clean-up unit will help you to tidy up after a dirty tire-changing or car-fixing job. It also will supply the soap and water for sticky fingers after a picnic and serve as an emergency lavatory during camping trips.

The kit is contained in a plywood box measuring approximately 7½" by 10½" by 13½" on the outside. Its contents include a one-gallon water tank with spigot, a 2"-deep aluminum wash tray, cake of soap in a covered box, can of grease-solvent powder, comb, mirror, paper-towel roll and washcloth. And there's still room for other items you may want to add.

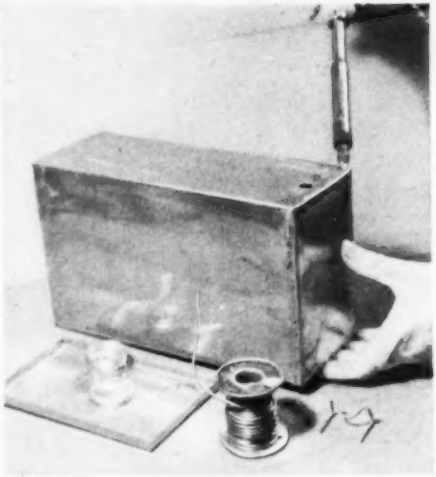
The important thing about the tank is that it must be rustproof, which means that



COMPACT DESIGN is shown at right. As water may spill when the tray is moved, waterproof plastic sheets should be used to cover the inside of the door and bottom of tray section.



SHEET ZINC sold for chimney flashing can be used to make rustproof tank. In bending, allow for the thickness of the metal. When soldering seams, use a noncorroding flux; coating them with waterproof lacquer or other sealant is recommended. Wash all soldering flux from the tank after completion.

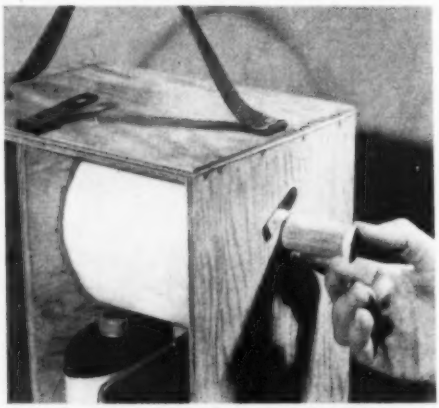


you probably will have to make your own from solderable, nonrusting sheet metal. The spigot is an automobile-radiator petcock secured by a nut, washers and solder, with a piece of copper tubing for the spout.

The washbasin shown here is an aluminum baking tin, measuring 2" by 6⅝" by 8½", plus handles. If you want a wider or deeper one, it's easy to adjust the over-all dimensions of the container.

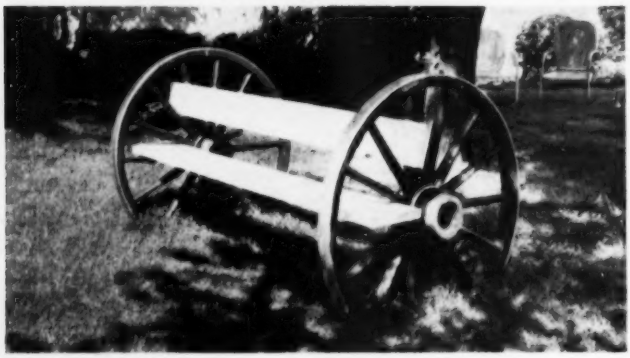
For the tank filler and cap, an aluminum 35-mm. film can was used. The can was fastened in place by cutting out the bottom, leaving ¼"-by-¼" tabs that were spread inside the tank top and riveted. Seal with waterproof cement or putty.

Quarter-inch exterior plywood was used for the case, with the exception of a ½" top and a ⅜" shelf.



PAPER-TOWEL DISPENSER holds a standard 11"-wide roll cut in half. A length of 1" dowel or broomstick, held in place by a swiveled metal clip, supports the roll.

Wheels from an Old Farm Wagon Make Decorative and Useful Seat



Two discarded, wide-rimmed wagon wheels form the setting for this rustic bench, with the wheels embedded in concrete so that they won't roll away with you. The seat and back are two 2"-by-10" planks, 8' long, bolted to the spokes by cleats. The bench is brightly painted in red and white.—*Grover Brinkman, Okawville, Ill.*

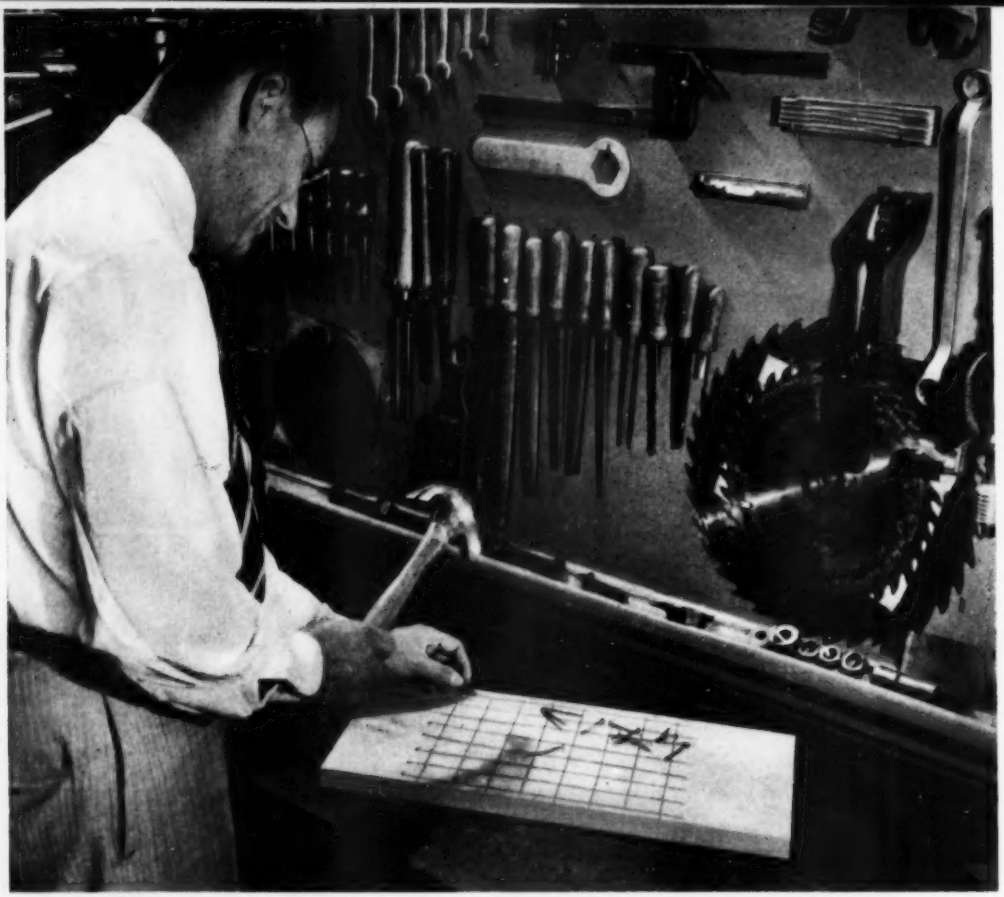
New for Your Car

1. Cattle Horn for Road or Range. You can sound off gently to warn pedestrians or roar full blast to get a slowpoke road hog over to the right lane with this variable electric horn—and its tone is guaranteed to attract cattle from the far corners of the grazing land. A control lever mounted on the steering column changes the stroke of the horn diaphragm to alter the pitch and volume. It is 8″ high and 5″ wide, can be installed without disturbing the horn already on the car.

2. Felt Disk Prevents Static Shock. Rubbing one of these felt pads over the surface of your seat covers is said to give protection from static shock for about six months. The pads, treated with a chemical that is harmless to fabrics and finishes, are packed in a plastic envelope for convenient storage in the glove compartment.

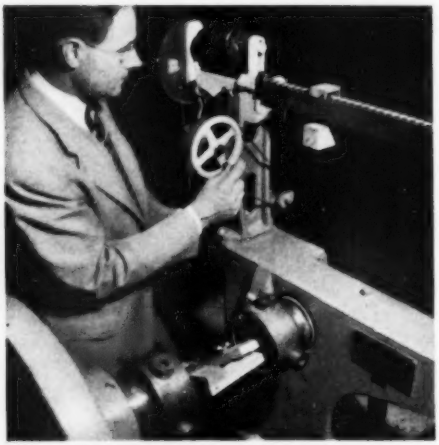
3. White Walls Go On Like Patch. You can have white walls put on your tires at nominal cost by a service department. The white covering is live rubber, ⅛″ thick, and is said to stay white and stick tight in spite of flats or bumping your tires against the curb. The manufacturer distributes the material only for shop installation.

Further information on the products described above can be obtained from: 1. Kattle Kaller Division, 1931 South 20th St., Station C, Omaha, Nebr.; 2. Braun Laboratories, 206 S. Hutchinson St., Phila. 7, Pa.; 3. Wite-Wall Rubber Co., 13225 Livernois Ave., Detroit 38, Mich.



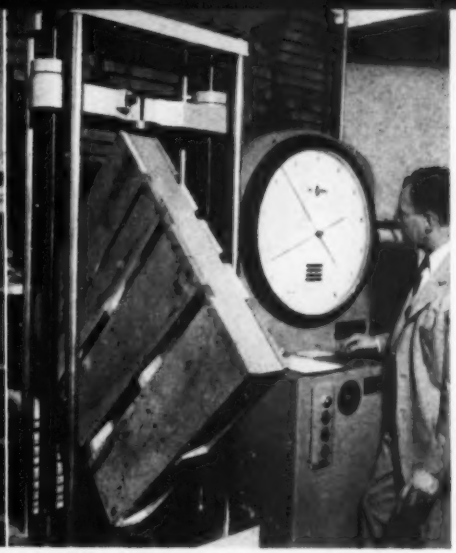
ONE TEST STARTS when Prof. Stern hammers different kinds of nails into a carefully graded board. Weeks to months later, he'll measure how hard they are to pull out.

College Examiner Is Rough on Nails



A TORTURING TWIST is applied to a furniture skid to find out exactly how much torque is needed to pry it open at its nailed joints. This test may save many a future table leg.

MEASURED BLOWS from the weight on this guillotine-like device reveal how readily a nail penetrates wood of known hardness. No human could hammer so consistently.



"IF YOU WANT TO MAKE a good pallet, you have to use a good nail," says Stern, here testing a pallet's rigidity on a machine that applies pressures of .10 to 12,000 pounds.

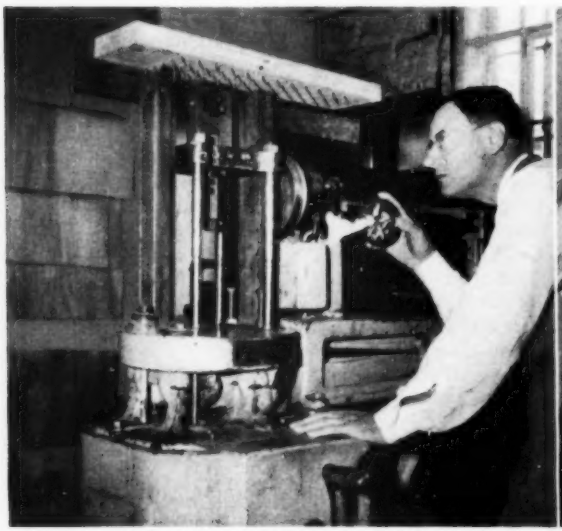
Only the best can pass Prof. E. George Stern's rigorous tests.

HUNDREDS of kinds of nails go to Virginia Polytechnic Institute and take exams from a research professor who knocks them for a loop.

E. George Stern is his name, and stern is his manner, too, towards what he refers to as "the indispensable fastener."

For eight years, Stern has done nothing but put nails through tough tests like those shown here.

Both nails and the building industry are the better for the experience.



SLOW AND STEADY is the pull exerted on driven nails by the motor-operated claw of this machine. Motor runs at a constant speed and the machine measures nails' resistance.

ONLY A CHARGING BULL, striking a wire fence, could match strength of yank that machine above gives driven fence staples. Cable on pendulum axis applies brutal tug.

De Luxe Power Tool Whips Out Homework

New Shopsmith, styled like a home appliance, goes through its paces by helping build a table before your eyes.

By Paul Corey and Darrell Huff

THE longhairs are calling this the Do-It-Yourself Age. That means they have finally stumbled onto what most POPULAR SCIENCE MONTHLY readers knew all along: It's fun, and frequently profitable, to do things with your hands.

So 1954 is a logical year for the birth of a new Shopsmith. Called the M5, it is a multiple-purpose power tool designed solely for home-workshop use.

NEW MODEL comes ready to run—all you have to do is plug in the power cord. Besides motor and bench legs, it comes with a 9″ circular saw blade, sanding disk, miter gauge, drill chuck and centers. Tool being delivered to authors here was first M5 model manufactured.

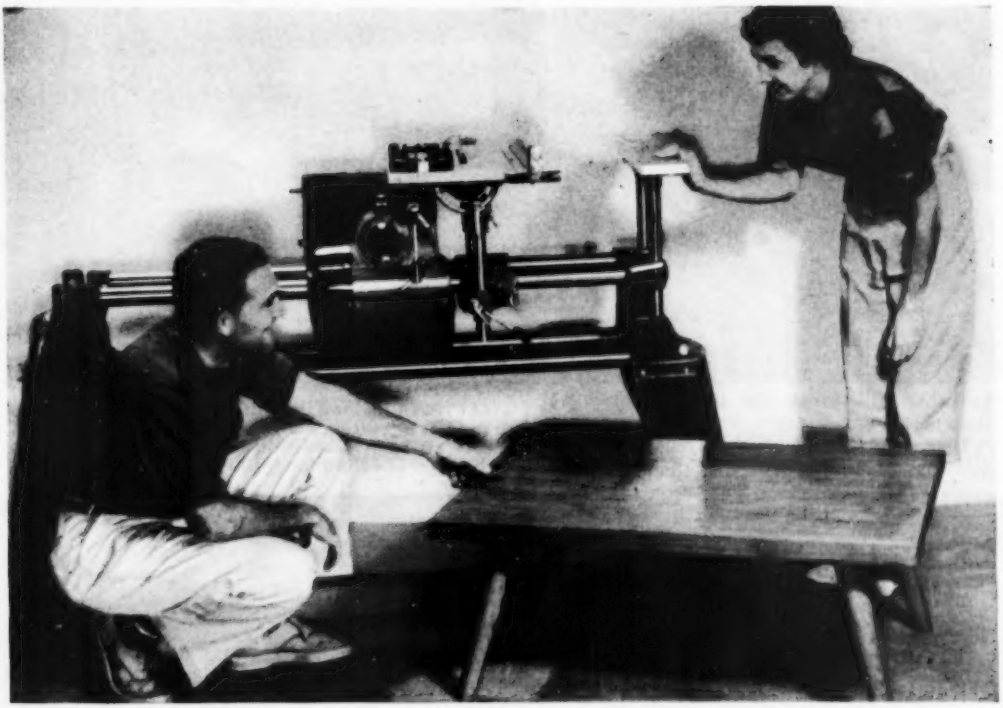
What would you do if a truck unloaded one at your home? You'd probably do what we and our camera did: stand back and look at it, move in closer to see the details, and then put it through its paces. As your representatives, we had the opportunity of doing just this with the first completed model of the M5.

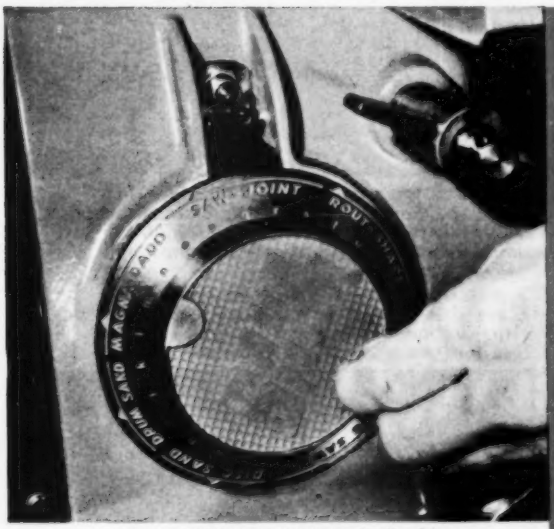
Pretty with a purpose. You'd probably be struck first, as we were, by its good looks. Here is streamlining with a purpose: safer use, easier maintenance. Protruding parts are a hazard and a dust-catching nuisance in a shop, and this tool is designed to have a minimum of them.

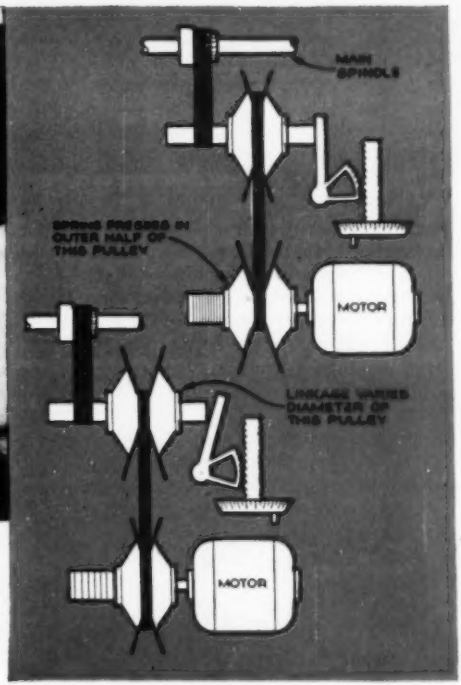
There's another reason for emphasis on appearance. In many homes you might want to put it alongside your wife's laundry equipment or in a basement recreation room. Attractively painted, the new Shopsmith looks like a "home appliance."

When you examine the machine you find that it comes ready to do five basic kinds of work, as the old Shopsmith did. The surprise is how much better or easier it does them. The M5 shifts in less than a minute to put its major parts, including a ¾-horsepower motor, to work in five ways:

- To begin with, you have a 9″ tilting-table saw.
- Slip off the saw arbor, put on a chuck, and you have a horizontal boring machine.
- Replace the chuck with a disk and you have a 12″ sander.
- Lift off the saw table, put in the tool rest and centers, and your lathe is ready to use.
- Or tip it to a vertical position and you

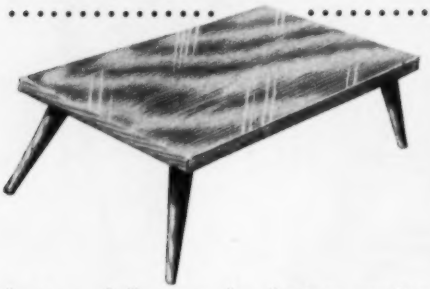






A BUILT-IN SPEED CHANGER is the biggest news in the M5 model. You simply set this dial on the headstock at the proper speed for the tool you are using—in this case, 3,400 r.p.m. for the circular saw. Drawing shows how it works: worm moves a sector that changes diameter of jackshaft pulley. Final drive to the main spindle is by a toothed rubber belt.

How a table is built with the new tool



have a drill press for boring, routing, shaping.

Dial sets speed. In every position you have something new: A speed changer built into the M5 permits you to dial any speed from 740 to 5,900 r.p.m. You'll want that slow speed for such things as large-diameter drilling, the high speeds for routing and shaping. Those in between mean that any job can be done at the *right* speed, with no compromises. And because changing speed is easier than cranking down a car window, you're never tempted not to bother.

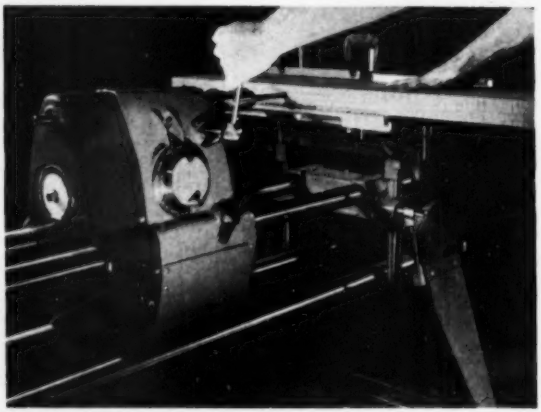
The M5 has an inconspicuous little something called "power mount" that its makers are very proud of. This is a pair of openings in which additional tools can be rigidly mounted, plus two new power spindles on the headstock casting. Just about any auxiliary tool the Shopsmith people produce can be mounted and put into action in well under 60 seconds.

One of these, a 4" jointer, is already in production. So is a jigsaw. A bandsaw will be ready shortly. Others will follow.

The stranger to Shopsmith will probably be most impressed by the way things work together. Whether you are drilling, sawing, sanding, shaping or routing, you use the same headstock, motor, frame, quill assembly and table. This means that the big table with its fence and miter gauge are part of the sander and drill press. You have all the adjustments available at all times. Example: you can combine fence and miter gauge to make a variety of jigs for sanding; and the same feed that you use for drill-press work carries the disk sander to just where you want it.

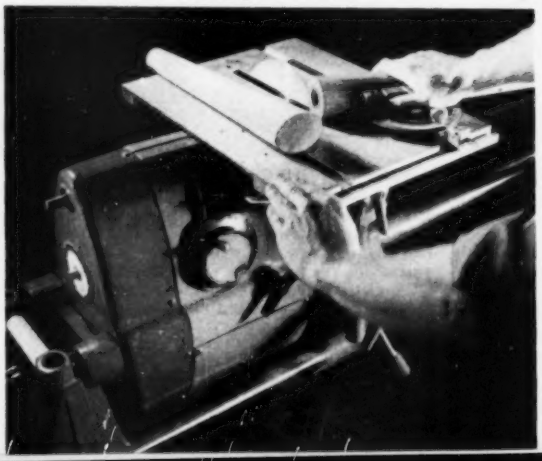
Changes for convenience. People who know the old Shopsmith will be most taken by some of the new conveniences. The built-

1 START WORK making the coffee table shown at the left by cutting a 2"-by-10" plank into three 40" lengths. Extension table and deep cut simplify handling long, thick pieces.

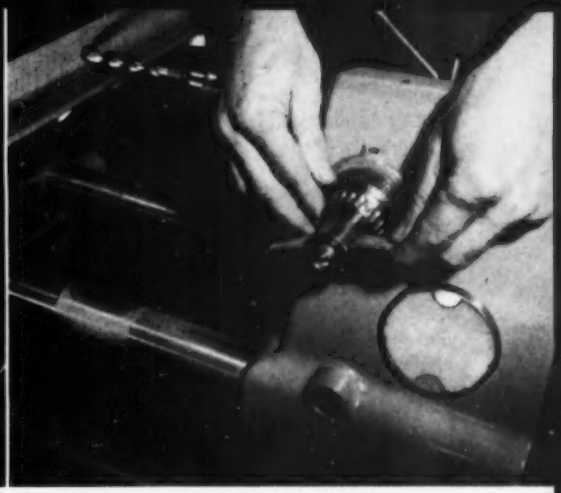


4 FOUR DOWEL HOLES are then bored in what will be inner edges of each plank. The locked rip fence backs up work; guide C-clamped on fence holds wood flat on table.

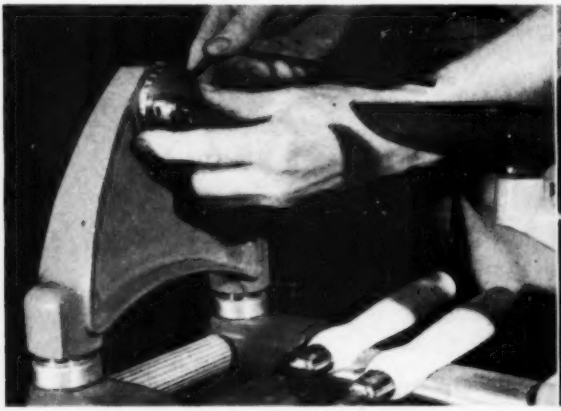
7 ANGLE-CUTTING tops and bottoms of tapered legs is not complicated. First step: with saw table level and miter gauge at 75°, big end of each leg is trimmed.



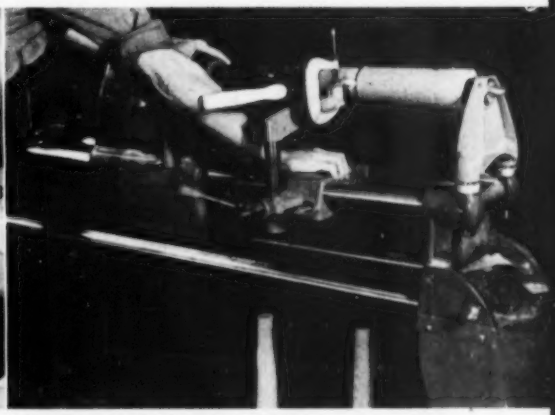
2 OFFSETTING FENCE for edge-finishing with disk sander is now a cinch—you loosen fence lock and turn offsetting screw with an Allen wrench. Edge-sand the three pieces.



3 DEPTH STOP on spindle helps in doweling job. With drill chucked, you lock quill temporarily with drill touching work, set the depth dial a bit over half the dowel length.

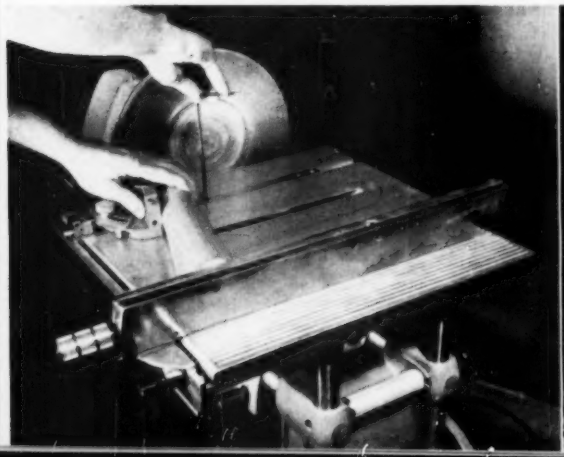


5 ECCENTRIC CENTER aids in repeat taper-turning, as for table legs. Rotate tailstock fitting to desired taper and lock it there. First turn four legs to straight 2⅜″ cylinders.

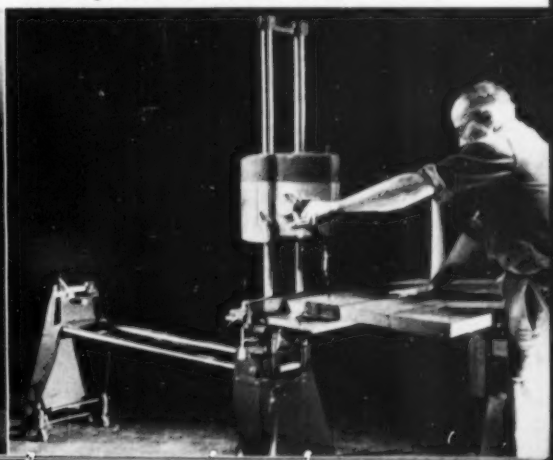


6 NEW TAPER-TURNING SETUP uses turning tool clamped to rest, which is slid along ways. Table legs are 14″ long, taper 1″. Toolrest height is set by new rack and pinion.

8 SANDING BOTTOMS parallel is next step. Cut end is butted against fence and miter gauge slid up and locked in with an Allen wrench. Then sanding disk is fed to leg.



9 LOCKABLE miter gauge and fence make fixture to locate dowel holes in underside of table for legs. Now glue in the legs and give the completed table a clear finish.



in speed changer with finger-tip dialing undoubtedly is the most important of these. But there are other features that users will also welcome:

1. The turn of a crank raises or lowers the saw table. The rack-and-pinion mechanism that does this also adjusts the height of the lathe tool rest.

2. The miter gauge can be locked to the table to form a jig. An Allen screw simply expands the bar in the table slot.

3. Depth of drilling is controlled by simply setting a dial.

4. The aluminum saw table is bigger, smoother and stronger.

5. The extension table can be put at either end of the machine.

6. The rip fence aligns itself and locks with a single twist of the handle.

7. The lathe cup center can be offset up to ½" for turning tapers to a maximum difference of 1" between diameters.

8. Turning a setscrew offsets the fence slightly, when you want to use the disk sander for edge-finishing. You no longer have to cramp the fence manually and by guess, and then lock it in place.

9. Table trunnion and miter gauge have automatic stops at the settings that are most frequently used.

10. Maximum depth of saw cut is now 2½", which also means 45° cuts are possible on full 2" lumber.

The underlying idea back of these changes is to make power woodworking easy for the green hand as well as the experienced man. In line with this, the new Shopsmith arrives ready to use. There is no setting or mounting. Like an automatic refrigerator, it is simply plugged into the nearest outlet and put to work. When you are through using it, the tool can be rolled off to an out-of-the-way parking spot.

The makers expect the price tag to come as a pleasant surprise. At $269.50 it is priced, they point out, no higher than the old model including speed changer, bench ends and a ¾-hp. motor—all of which are among the things that are standard parts of the M5. END

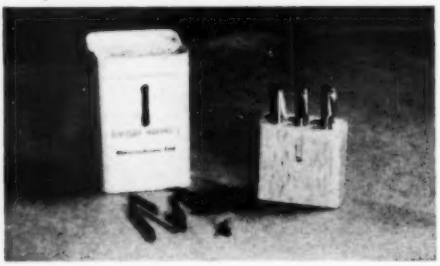
Cradle Makes Globe Easy to Use

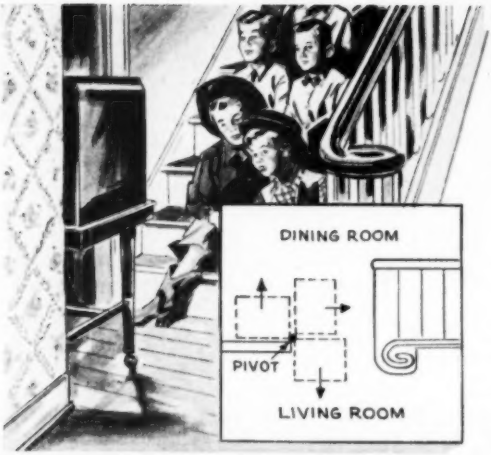
You can pick up a map globe like a ball and carry it to a chair for comfortable examination if it is kept in a cradle mounting. In this case, the globe was removed from its fixed-axis mount and placed on a clock case from which the works and face had been removed. The dial rim makes a good ring support for the globe. Jigsaw owners can quickly cut inverted arches to match the globe curvature and interlock them at 90 degrees, if a clock isn't available.—*Carlton Bucher, White Plains, N.Y.*

Pop-Up Case Holds Rotary Files

A SPRING bent from a corset steel or clock spring pushes up files or drills when you lift the lid of this bandage case.

Shape a wood block to slide loosely in the can and drill it for the bits. Staple the spring to the block bottom and press it into the can. A screw driven part way into the block through a front slot keeps it from popping out too far.—*Keith Heryford, Cedarville, Calif.*

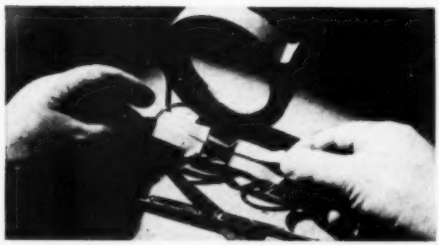




Television Set on Hinges Faces in Three Directions

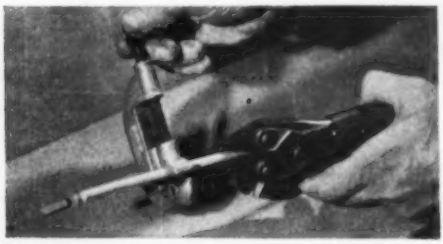
Our TV set took up too much space in the living room until we mounted it on a hinged shelf attached to the end of the hall partition. Now it can be swung around to face either the living room on one side or the dining room on the other. When it's turned straight ahead, the stairs make an ideal grandstand for kids' shows.

The pivoting leg should be attached to the wall with sturdy hinges, and the other three corners can be supported on legs with casters so the set will roll easily.—*Addison U. Moore, New Egypt, N. J.*



Slits Help You Drive into Sun

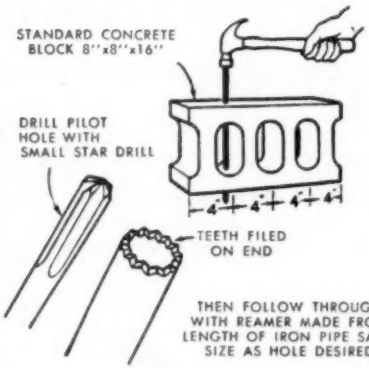
If you carry masking tape in your car, you'll be ready for difficult driving into the sun. Put two pieces across your sunglasses, leaving ⅛" space between. It helps a lot. —*Ken Murray, Colon, Mich.*



Tubing Cutter Snips Dowels

A tubing cutter will turn out dowel lengths with square, neat and splinterless ends. Tighten the cutter screw with each turn around the dowel.—*Walter E. Burton, Akron, Ohio.*

DRILLING CONCRETE BLOCK



Straight, clean-cut holes can readily be made in concrete-block walls for the installation of water pipes and wiring conduits if the holes are spotted so that the drill will pass through the center of the cores (hollows) in the blocks. This reduces work to a minimum and lessens the risk that the drill will be turned aside by the curved core wall. Cores can be located by measurement once the type of block to be pierced is known. This can often be found by inspecting the foundation or the top of a wall. A common type of block is shown, but others of this size may have a different core arrangement.

Rotate the reamer while driving it.

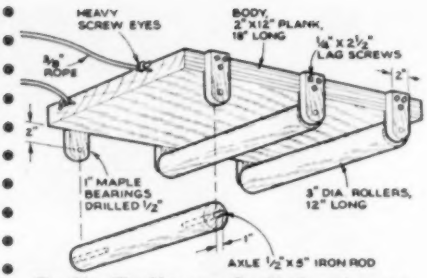
FOR YOUR *POPULAR SCIENCE MONTHLY* INFORMATION FILE

How I Installed My Attic Louvers

1 THIS ONE-PIECE, screened louver is made to fit between studs. I started by taking outside dimensions of the body and marking them high up on the attic wall.

2 A SERIES OF HOLES bored with a large auger bit let me open the wall with a keyhole and crosscut saw. The opening completed, I angled the louver through, pulled it back into place and nailed it to the studs.

3 THE LOUVER, painted to match the outside house-trim before I started, is inconspicuous and effective. There is a second one on the other side of the chimney.—*Robert Hertzberg, Jackson Heights, N. Y.*



Dolly Rolls on Soft Surfaces

THREE wooden rollers mounted under a thick plank will help you move heavy loads easily—even over lawns and gravel.

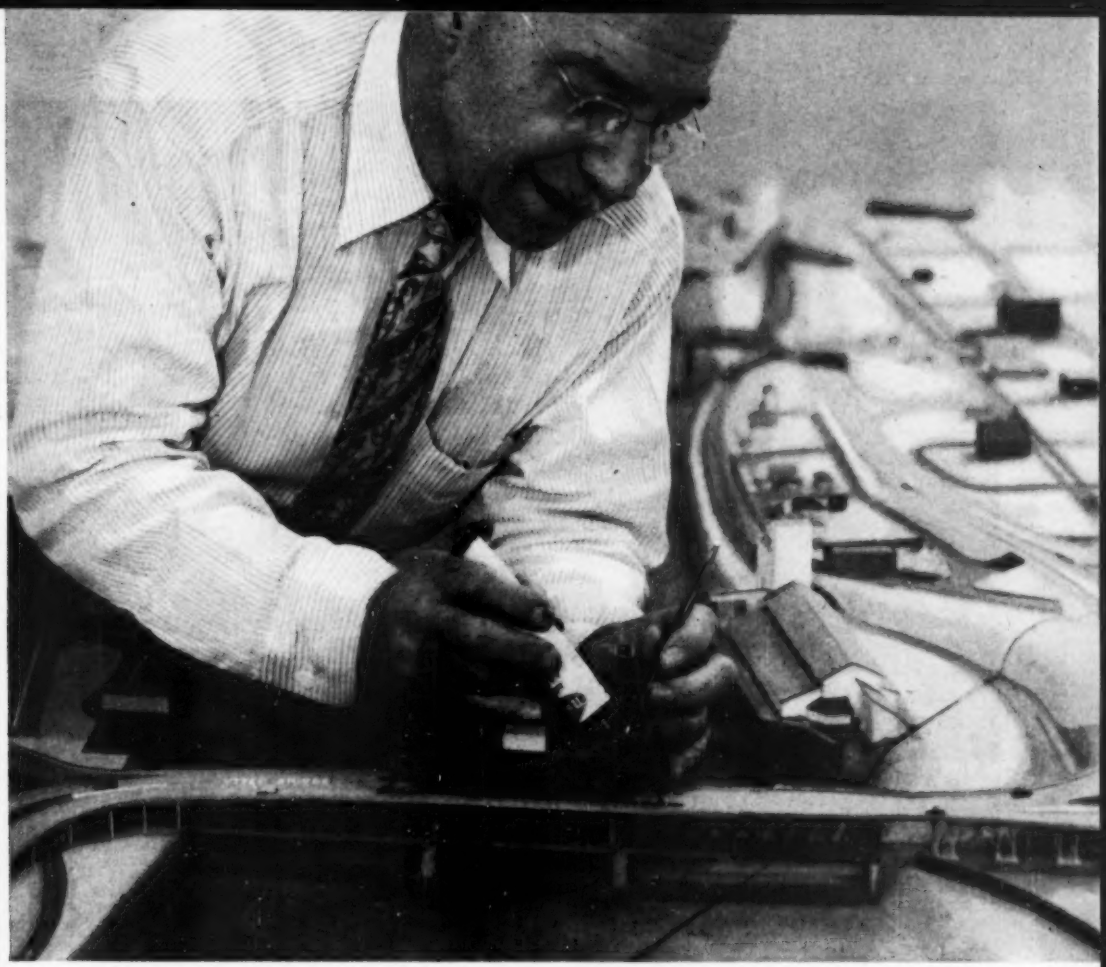
Use rolling pins or 12" lengths of 3"-diameter solid wood column for the rollers. Drive short lengths of ½" iron rod into holes bored in their ends for axles. Cut and bore six maple bearings to support the axles and saturate the axle holes with oil for easy rolling.—*T. F. Zimmerman, Beverly, N. J.*

These Pliers Speed Splicing

A SMALL hole drilled in the handle of your pliers will help you make firm, tightly wrapped splices in wire. Make one twist by hand to bring the wires together, then slip the drilled handle over the wire and swing it under and over to form a tight roll.—*Norm Jacky, Fond du Lac, Wis.*

Emergency Soldering Iron

IN A pinch, when electric power or a regular iron is not handy, jab a piece of copper wire into the business end of a cigar for soldering thin wires or small parts. Puff vigorously to keep the copper wire hot. It works and no buts about it. —*Arnold Steckler, Washington, D. C.*



Leaning over his "city," road builder Jim Teed glues in part of bridge superstructure.

Tomorrow's Highways Blueprinted in 3-D

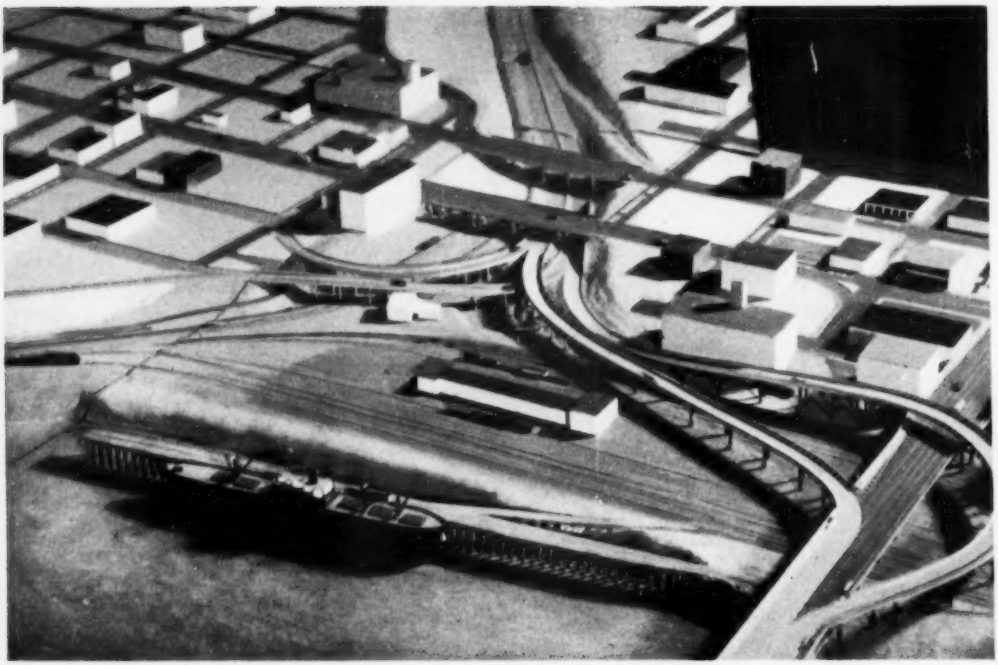
Midget models show Oregon's future roads in such accurate detail that they even stand up as exhibits in court cases.

By E. Milton Grassell

OREGON'S future highways already exist in miniatures. These miniatures, though small in scale, are large in area. Some stretch out 40 feet in the Highway Department's model room in the state capitol at Salem.

Here engineering hieroglyphics are translated into three-dimensional reality complete with buildings, cars, trucks, trains and ships—all so skillfully constructed that from even a short distance away the illusion is startling.

All are precision-built to a scale of 1″ to 50′. The width of super four-lane highways



HIGHWAYS AND BYWAYS of Oregon's road system get their start in miniature models like this one. Painstaking details, such as cars, trucks, ships and trains lend realism to the layouts. Business and residential buildings, built to scale, are placed accurately.

is reduced to 1½"; ocean liners are 10" long, passenger cars ⅜".

The superstructure for Portland's proposed Steel Bridge was built from 1/32"-by-1/32" balsa-wood splinters so small that dental forceps—long tweezers—were needed to place the pieces for gluing. Beside these structural pieces a toothpick looks like giant timber.

So delicate was this tiny piece of work that the builder had to hustle to complete it in 10 days.

Tools Are Simple

Model road building in Oregon was started back in the early 1940s by the State Highway Department's chief engineer, R. H. Baldock. Immediately, the models served purposes beyond Baldock's fondest dreams. Six years ago he created a new modelmaking section within the Traffic Engineering Division, under the direction of expert Jim Teed.

Despite the models' minute details, requiring precise workmanship and extreme patience, the tools used to make them can be easily and economically duplicated by the home modelmaker.

One is a knife made from a discarded single-edge razor blade, glued into the kerf of a ½"-by-6" hardwood dowel with model-airplane cement. This handy cutting tool doesn't spread the wood the way an ordinary knife does. It cuts balsa pieces up to ¼" thick.

For cutting arcs and circles, a cutting edge is ground on a pair of 6" sheet-metal dividers. On thicker pieces, the dividers are revolved several times before cutting entirely through.

Airplane glue holds the models together. The highway engineers say a properly clamped glued point is stronger than the original wood. For clamps, they generally use ordinary clothespins.

To translate complicated blueprints into three-dimensional models, the engineers first photograph blueprints showing the plan view. The negatives then are projected to scale in an enlarger, just as regular photo-enlargements are made.

The photoprints are placed directly over

Tweezers do a big job in building small highways.

a ½" plywood base, and actual construction begins.

When the ground adjacent to the road is uneven, fill is made with crushed paper to about one inch from the surface. Then mineral wood (the kind used for insulation) is spread on and the surface is finished with wood putty.

Everything Is Built to Scale

Rivers, lakes and streams are painted blue, the terrain green; old roads and streets are dark gray. Light gray indicates new traffic routes. An ordinary ruling pen, the kind used in mechanical drawing, is used to line standard traffic lanes in yellow.

Roadside scenery, commercial and domestic buildings, churches, traffic signals and directional indications, cars, trucks, buses and ships—all built to scale—are added to give the model a final cluttered, lifelike touch.

Modelmaking for the Oregon State Highway Commission pays off in many different ways.

Errors in preliminary design that normally wouldn't show up until actual construction at the site got under way are caught in the model room. Minor alterations may improve the design and possibly save the taxpayers some money.

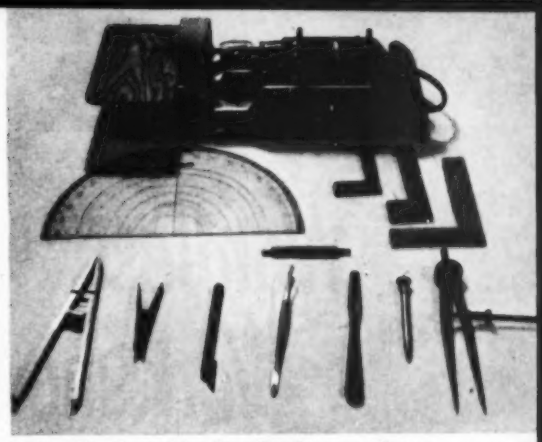
Traffic Engineers Use Models

Landscape engineers also find the models helpful when they want to beautify highways with landscaped dividers or improve the roadside view.

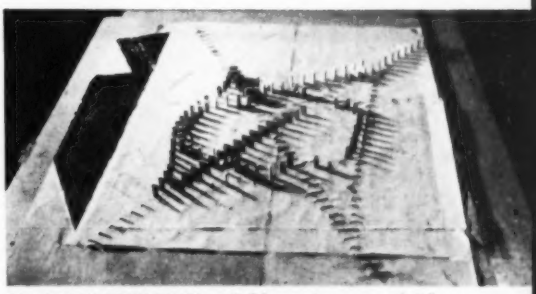
Traffic engineers study the miniatures when routing traffic and placing signals and directional signs.

These miniatures make impressive exhibits at legislative and highway-commission meetings, as school displays, and even in court cases.

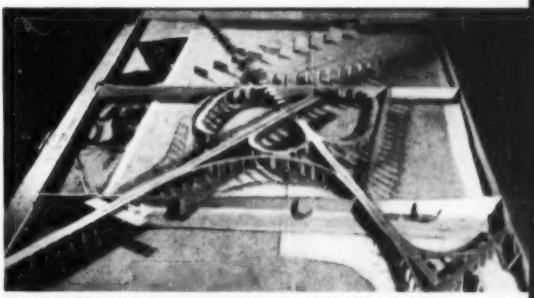
But mistakes can result in spite of all precautions. Take the case of one irritated businessman who demanded an immediate audience with the chief engineer. "Your model isn't accurate!" he exploded. "I have two plate-glass windows in my plumbing shop. Your model shows only one." END



BASIC TOOLS used by Jim Teed in translating engineers' blueprints into three-dimensional models are simple, many of them homemade.

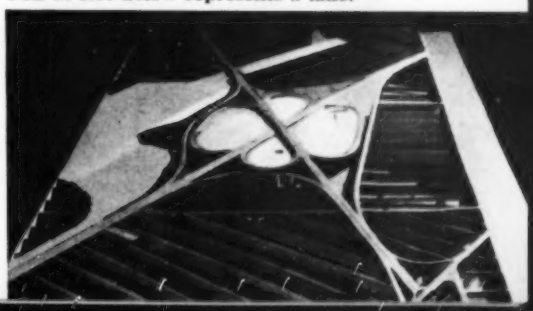


PHOTOENLARGEMENTS of blueprints are laid on a plywood base. Next step is the placing of strips to represent roadbed elevations.



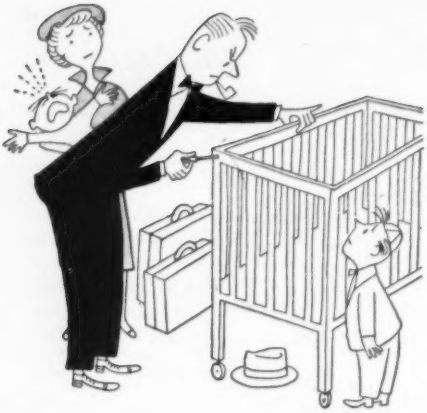
THE MODEL begins to take shape. Strips of wood have been glued to the roadbed elevations to form the finished roads.

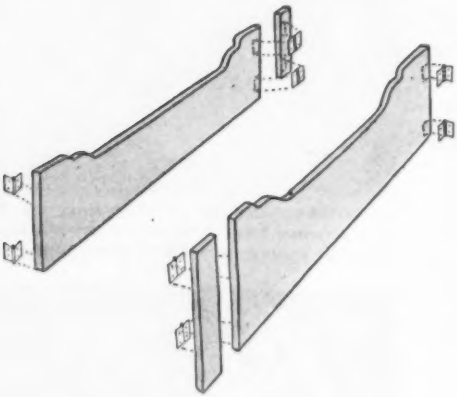
FILLING in of terrain details begins when the highways have been built. Balsa-wood section at left below represents a lake.

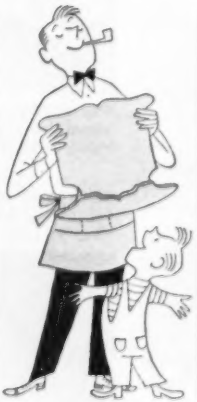


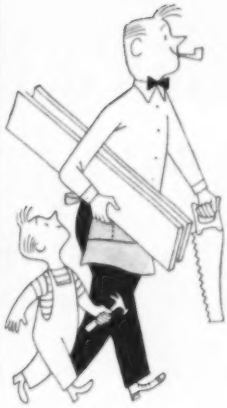
By Roy Doty and Hi Sibley

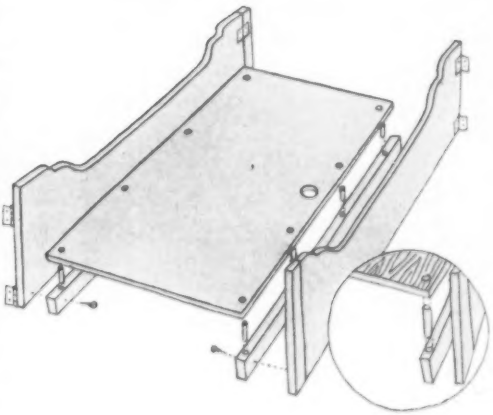
Wordless Workshop

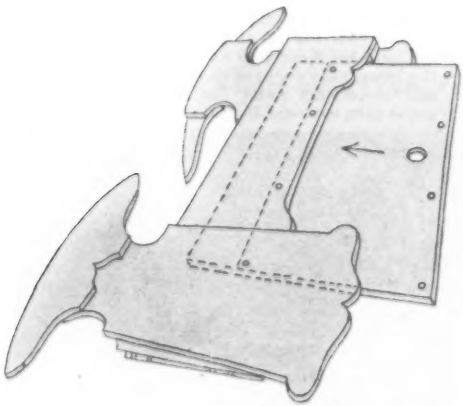






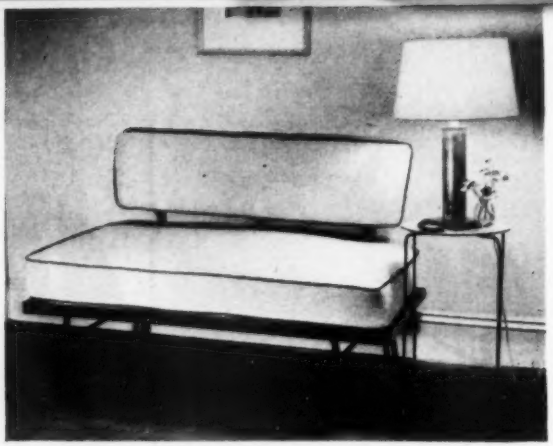




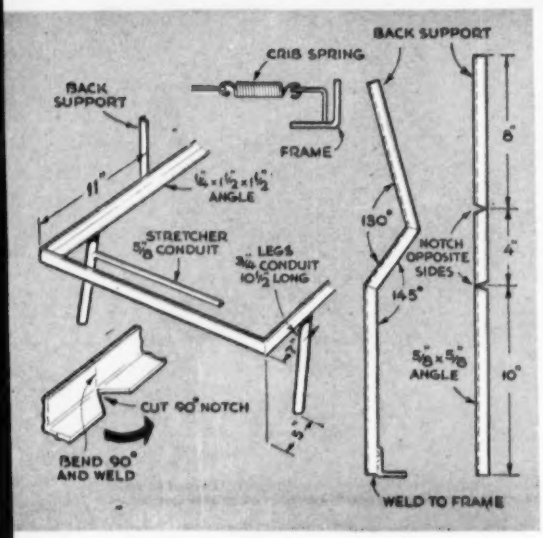


Next Month: A Handy Gardening Tray

Crib Parts Grow Up Into a Sofa



The simple modern base of this handsome home-salvage job fits in with most of the iron furniture so popular today.



With an outgrown crib spring and mattress on hand, this settee can be yours for a fraction of its store value.

Measure the crib spring and bend a frame of 1½" angle iron to inside dimensions about ½" larger each way. Strengthen the corners by welding across the closed-in edges of the notches. You can have the welding done at moderate cost, if you do not have a welding outfit yourself.

Either pipe or thin-wall conduit will be suitable for the legs and stretchers. The back supports are shaped by notching lighter angle not quite through, and welding at the bends. Weld the supports to the frame and cut a piece of ⅜" plywood so that it fits across them. Wire-brush the metal parts before painting.

Upholster the back with cotton batting, hair or glass-fiber insulating mats. Cover it and the mattress with fabric.

FRAME IS SIZED to an easy fit for the crib spring. One flange of the angle stock is notched and the other bent around to form the front corners. Rear ones are cut 45° and a separate piece is welded across them. The crib rests on the bottom flange of the frame.

WELDS AT CORNERS require about 100 amp. of current. Clamp the straight frame member and the bent one in position for welding the open rear corners as shown. Welding legs and stretchers calls for light current and great care to avoid burning through thin wall.

A GRADER BLADE is among the tools you can use with a Bolens Ridemaster. The little tractor has a 6-hp. air-cooled engine with a V-belt drive. Each rear wheel can be adjusted vertically, so that you stay level while working along a slope. With a single speed, which gives a 1½-to-3-m.p.h. range, the tractor costs $515. Two forward speeds cost $80 more.

With the new baby tractors you can do your

Gardening from the Saddle

Today's range of sizes and accessory tools will handle almost anything, from a half-acre crabgrass ranch to a weekend farm.

By Hartley E. Howe

ANYONE with a good-sized hall closet can keep a tractor now. The giants of the wheat farms and cotton ranches have baby brothers that take up no more room than a big express wagon. Yet these midgets are sturdy enough to push mowers, pull grass rollers, haul carts loaded with tools or fertilizer, and even push light snowplows.

These very small machines are primarily for lawn care. If you want more work capacity, there are somewhat larger riding models with a real tractor look and feel about them, even though they are no bigger than a motorcycle and sidecar. Scaled to their size are a long line of farm and tractor tools, so that these work ponies can do many of the jobs of the big fellow—pull a plow through heavy loam, spray six rows of vegetables, scoop out the dirt for a wading pool. In fact, one maker claims his baby

These light tractors run on three wheels

FROM GOLF TO GRAVEL is the history of this three-wheel tractor. The Caddylack was designed originally by the Dero Corp. as a mechanized caddy. Made in both gasoline and electric models, its job was to carry two men and two golf bags around the links. Now it has been modified into a yard tractor with a built-in dump truck. The hopper carries half a yard of material.

SUNDOWN FARMERS—some 2,000,000 factory or office workers who do their farming after work and on weekends—form the market at which the Bradley Tri-Trac is aimed. Sears, Roebuck is distributing the little workhorse, which has its own line of 12 accessory tools including a dump rake and a planter. Powered by a 6.1-hp. engine, the three-wheeler is designed to plow, plant, cultivate, mow, and plow snow. It turns on an 8′ radius. The wheelbase is 68¾″; the front-axle spread can be adjusted from 48″ to 72″ at 2″ intervals. There is about a 2-m.p.h. range of speed without clutching in both forward and reverse, done by a quick-change lever working off the adjustable jackshaft belt. Without accessories, the tractor sells for $598.

will do all the work on a 10-acre farm.

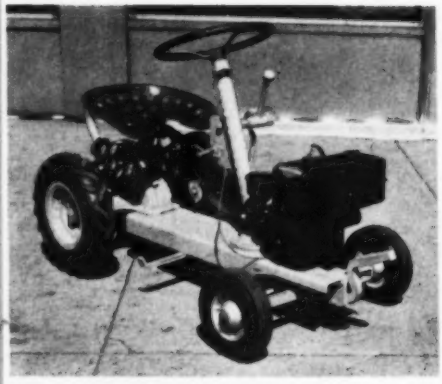
The prices for back-yard tractors vary pretty much according to the horsepower. The very smallest mower jobs start around $200. Big fellows over eight horsepower can cost as much as $700. By the time you get up to these sizes, you are nudging the smallest of the regular farm tractors, such as the 9¾-horsepower Farmall Cub.

Anyone buying one of these tractors is going to have to face up to the small-boy problem. A miniature tractor attracts kids like a personal appearance of Captain Video. If there is any chance of a boy talking himself into a driver's job, you may want to consider modifying the throttle with a spring return, which automatically slows the engine to idling speed if the driver takes his finger off the button. This keeps the tractor from running away with a small boy. A basic driver's course is indicated for any young operators, with plenty of supervision. And in any case, with kids around you'll want to check on your stopping time—not all tractors are equipped with brakes.

The familiar walking tractors are getting into the riding act, too. The bigger ones can now be bought with riding sulkies, so that they will haul you around the yard. Of course the real target of all this is Pop, the man whose motto is never to stand up when he can sit, and never to sit when he can lie down. The tractor builders still haven't turned out a combination garden cultivator and lawn lounge, but they are probably working on it. I'm putting my order in for the model with the foam-rubber mattress, FM radio and a good reading light. It should be along any day now.

Further information about the tractors pictured can be obtained from: Bolens Products Division, Port Washington, Wis.; Dero Corp., Church and Elm Sts., Willoughby, Ohio; Sears, Roebuck and Co., 925 South Homan Ave., Chicago 7; National Farm Equipment Co., 142 Greene St., NYC 12; Cheston L. Eshelman Co., 119 Light St., Baltimore 2, Md.; Musgrave Mfg. Co., Springfield, Ohio; Ride-A-Mower Co., 305 Knowlton St., Bridgeport 8, Conn.; Pioneer Mfg. Co., 1910 South 81st St., Milwaukee 14, Wis.; Tiger Tractor Corp., East and Mazelle Sts., Keyser, W. Va.; Garden-All Tractor, Liberty, Ind.; Red-E Tractor Co., Richfield, Wis.

These tractors are the little jobs



HITCHES, front and rear, raise and lower on the Eshelman, above, to allow attachments to be slid on or off without the use of tools. The 3-hp. engine has forward and reverse speeds, the power being transmitted by a roller chain from the engine to the gear-reduction unit. This model, 48″ over-all, 26″ high and 22″ wide, costs $279.50. More powerful models cost up to $595. Accessories include a buzz saw and a 1,000-watt generator.

A THREE-HORSEPOWER, air-cooled engine drives the Mascot at right, which lists at $225. National Farm Equipment Co., the maker, claims it can pull a 3,000-lb. load on wheels. Highly maneuverable, the machine is 64″ long, 28″ wide. Besides the cutting reel shown, implements available include plows and harrows.

These riding mowers are specialists in lawn care

A ROTARY CUTTER whirls under you when you ride the Mow-Cycle, but it can haul a light roller or cart. The 3-hp. riding mower, which has a clutch and hand throttle, has a 5-m.p.h. top speed. Weighing 198 lb. the little machine is 46″ long, 26″ wide. Made by Musgrave, the Mow-Cycle sells for $274.50, the 2-hp. Lawn-Cycle for $199.50.

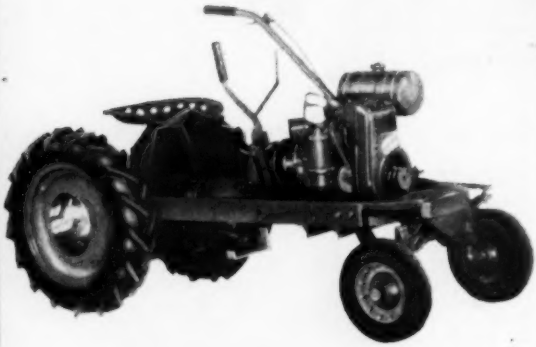
CUTTING GRASS is this baby's basic job. Only 49¾″ long and 24″ wide, Ride-A-Mower has both forward and reverse, can pull a cart or push a light snowplow. The 2-hp. tractor with built-in rotary cutter costs about $265. A 3-hp. model, without the cutter, and made to take a reel mower ($100), costs the same. Accessories include a lawn sweeper.

Please turn the page for more tractor photos.

These middleweights are garden work ponies

REAR ENGINE puts the weight over the drive wheels of the 6-hp. Page above—and also gives the operator a clear view of attachments that fit under the frame between the front and rear wheels. Top speed is a little under 4 m.p.h. This tractor costs $540; the maker, Pioneer, also turns out a model with an electric-starter unit.

A COMPACT TRANSMISSION, with a clutch, gear reduction, neutral, forward and reverse all in one unit, is featured in the 5¼-hp. Tiger. The tractor can haul 4 tons, pull a 10″ plow through sod, or plow 18″ of wet snow. With a 5-m.p.h. top speed, the Tiger burns an average of 2½ gallons in 8 hours' work. The model shown above in use with a grader has double rear wheels, an extra. The 5¼-hp. model costs $465; an 8-hp. job, $21.50 more.



A TILLER steers the economy model of the 6-hp. Gard'n Mast'r, left. It has a Chrysler transmission, three forward speeds and reverse, costs $475. Garden-All Tractors also makes models with steering wheels, brakes and larger engine—priced up to $210 more.

The biggest garden tractors can work a small farm

FOUR TONS is the pulling load claimed for the Red-E at left. One of the largest of the midgets, the tractor is 84″ long, 48″ wide, weighs 770 lb., has an 8¼-hp. engine with Borg-Warner transmission and belt-power take-off. There are three speeds forward and a reverse. The tractor alone lists for $700. Attachments run from about $30 to more than $400. END

For a modern note in your bathroom, build in this

Legless Dressing Table

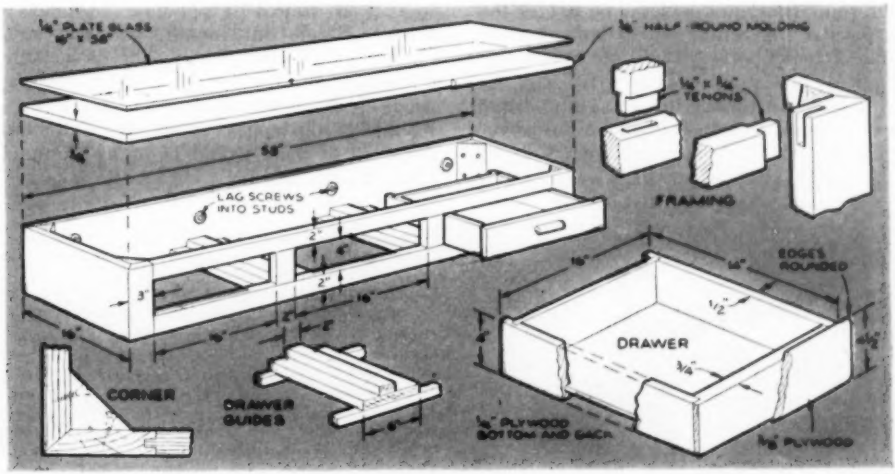
Bolted to the wall studs, it adds a lot of storage space.

IF THERE isn't enough space in your bathroom for this good-looking shelf-table, you can make it fit by building only two drawers instead of three. Even a single-drawer shelf is useful in a small room.

Use ¾″ pine for the sides, back and front rails. Miter the ends and join them with glue reinforced by corner blocks and screws. Assemble the front rails and drawer separators with glued mortise-and-tenon joints and nail the drawer guides in place. Edge-glue two 58″ lengths of ¾″-by-8″ pine to make the top, 16″ by 58″, then glue this over the shelf frame. Nail ¾″ half-round molding around the top to conceal the edges.

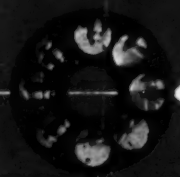
Make the drawers for an easy fit in the openings and glue a false front of ⅜″ plywood on the face of each. Cut these pieces ½″ wider and ½″ longer than each of the drawer openings so they will overlap ¾″.

Drill ¼″ holes through the back of the shelf in line with the studs and hang it with ¼″ lag screws. Enamel it to blend with the bathroom colors. Add decorative handles and have a piece of ¼″ plate glass cut to fit over the top. A mirror hung on the wall will make the shelf a convenient dressing table.—*Hi Sibley, Nuevo, Calif.*



Here's how to have fun with

Cameras



WHO'S GOING TO NOTICE a casual lounger checking his watch? Not the two characters above. Pass the papers, quick! But that wasn't a watch—it was a wrist camera. And Secret Agent XX got the picture at right, enlarged from the tiny contact above.

Want to have a camera always with you? These babies will ride in a watch pocket, shoot in a split second.

SO YOU want to be a secret agent and photograph spies as they pass the stolen papers? Your equipment is all ready for you. There are cameras no bigger than a pack of cigarettes. There are others the size of matchboxes. There are watch-sized cameras that strap on your wrist.

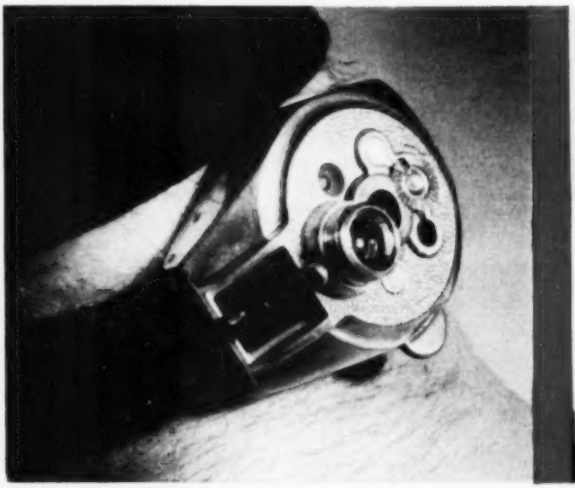
If you are going to be a top-drawer secret agent, pursued by beautiful adventuresses, you can get a precision-built foreign job that will set you back some $150. If you are more of a bottom-drawer type you can have a not-quite-so-precision-built foreign job for less than $10.

Even if your FBI appointment doesn't come through this month, you can still have a lot of fun with one of these subminiatures. But this special breed of camera needs special handling. Don't forget:

• Some of the negatives are so small that 20 to 25 of them would fit into a 35-mm. Leica frame. So don't expect the enlarge-

LIKE A TINY MOVIE CAMERA with its thumb-lever film transport, the Universal Minute-16 is one of few U.S. subminiatures. Same lever recocks the shutter. The f/6.3 lens has a fixed focus covering from 3′ to infinity. The shutter is set at 1/50 of a second. The camera uses 16-mm. film, which comes in 14-exposure, daylight-loading magazines. Processing is done by the manufacturer, and you get your camera—which lists for about $10—for nothing if you send in 30 films to be processed. Color film is available. A special flash unit is made for the camera.

You Can Hide in a Hand



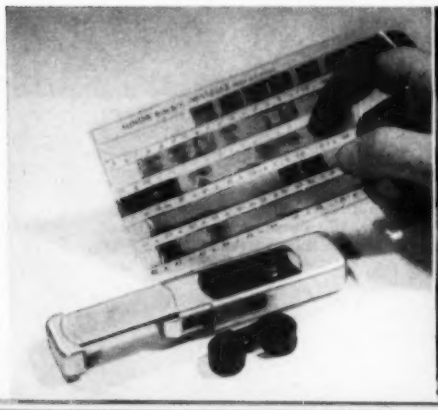
WRISTWATCH CAMERA is the Steineck A-B-C, which is aimed by looking down from above into a concave metal mirror, at left in photo. With a fixed focus, the 1½-ounce camera has only two lens openings: f/2.5 for cloudy weather, f/6.5 for sunny days. The shutter is set at 1/125 of a second. Price: $150.

FILM for Steineck is tiny circle that fits into a thin cassette, shown removed above, which screws into back of camera. As each picture is taken, the cassette is automatically rotated to move unexposed film behind the lens. When film is finished, entire cassette is sent to the camera's distributor for processing.

EXTRA-LIGHT MINOX weighs only 2½ ounces. A fine precision camera, it has an f/3.5 fixed-focus lens with a fixed opening. Shutter speeds vary from ½ to 1/1,000 of a second. Negatives, shown in strips in photo below left, are 8 by 11 mm. Camera is open to show how the daylight-loading magazine, which holds 50 frames, fits into the side. Made in Germany, Minox sells for $129.50.

Center photo below shows how binoculars can serve as Minox telephoto lens. Camera replaces the right eyepiece; the user then uses the left side as a coupled range finder. The Minox tripod is shown in use as a monopod. The single leg has two more legs inside it. The tripod comes with a tilting head.

Minox daylight-loading tank for developing film is shown below at right. Core, removed from tank for clarity, has spiral channel into which film fits. Still in its magazine, film is clipped to a rotating ring, held by left hand in photo. The ring is then fitted onto the core, which is inserted into the tank. Turning knob on top then screws core down into tank, at the same time pulling the film out of the magazine into the channels.



ments you get with a standard miniature.

• You must learn to freeze when taking the picture. A subminiature is practically weightless. It is easy to push the whole camera instead of just the shutter release. The result is a fuzzy picture.

• Since most of these little cameras are swallowed up in a man-sized fist, it is awfully easy to block the lens. You must practice holding the camera so that all your fingers are accounted for.

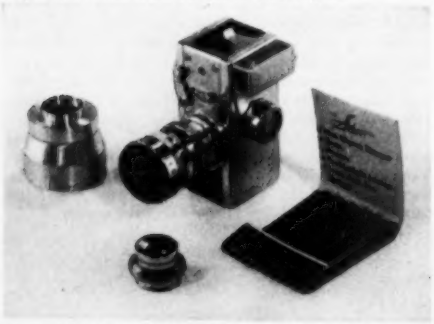
• Many very small cameras take odd sizes of very small film, so you aren't going to be able to take your negs down to the corner drugstore. Most of the camera distributors provide a mail-order lab service. In some cases, you can buy special developing tanks and do the job yourself.

Obviously, these little cameras are not for everybody. The man who wants a single good camera for all-around work had better look elsewhere. But the subminiature has a lot to offer the man who likes to have a camera always in his pocket, or the fellow who just likes to wander around quietly recording the public antics of the human race.

And of course if your FBI appointment does come through—why, you're all ready to go to work on those spies!—*Hartley E. Howe.*

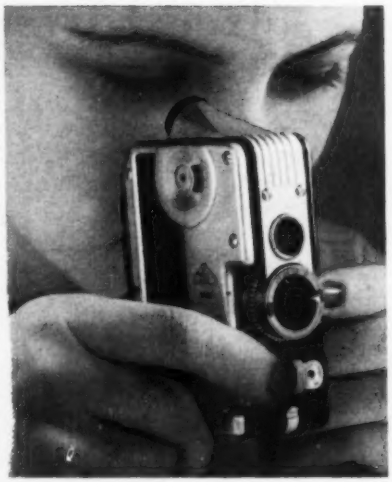
Further information about the cameras pictured on these four pages can be obtained from: MINUTE-16—Universal Camera Co., 28 W. 23rd St., NYC; STEINECK A-B-C, PETAL, RUBINA and RUBIX—Ercona Camera Corp., 527 Fifth Ave., NYC 17; MINOX—Minox, Inc., 140 E. 30th St., NYC 16; STEKY III—Wilmot Sales Co., 151 W. 28th St., NYC; GEMFLEX—Schmidt & Co., 136 Liberty St., NYC; MINICORD—King Photo Import Co., 1133 Broadway, NYC; MAMIYA—Mamiya Camera Co. of America, 82 Wall St., NYC.

SO SMALL it is lost in your eye, the Petal is the diameter of an overcoat button. It takes six pictures on a tiny ring of film. Shutter speed and lens opening are fixed. Enlargements are included in price of film. Made in Japan, Petal sells for less than $10.

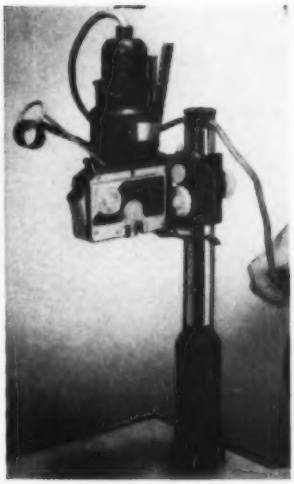


A TELEPHOTO LENS, shown mounted above, comes as an accessory to the Steky III. This 16-mm. job, made in Japan, lists for about $22. The standard f/3.5 lens has a fixed focus, can be closed down to f/16. There are three shutter speeds and bulb. Film, in 24-frame cartridges, is processed by the distributor. Accessories include a flash gun.

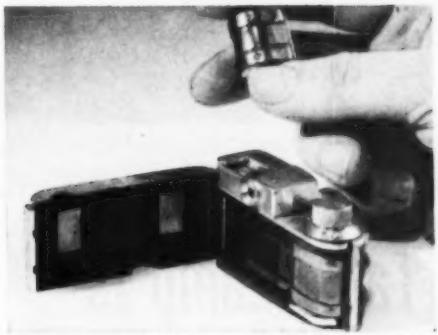
SIZE ALONE is what distinguishes the tiny Gemflex from the familiar twin-lens reflex cameras at first glance. Actually, the top lens of the Japanese-made camera is a viewer; the f/3.5 taking lens has a fixed focus. There are three shutter speeds and bulb. Made of die-cast duralumin, the camera uses 14-mm. film. It lists for about $20 with six films.



A TRUE REFLEX camera, the Minicord has twin coupled lenses with an f/2 taking lens. No bigger than a pack of king-sized cigarettes, the Austrian-made camera uses 16-mm. film, lists for $97.50. The all-metal, focal-plane shutter has speeds from 1/10 to 1/400 of a second. The camera is especially suited to quick-sequence pictures: pulling back the lever beside the lens transports the film and resets the shutter. As shown at right, the Minicord's special enlarger uses the camera itself to project the image. A negative holder is substituted for the film holder at the back of the camera. The whole enlarger packs into the wooden box that serves as a base.



THE FLASH ATTACHMENT towers over the matchbox-size Mamiya Super-16. Made in Japan, the camera has an f/3.5 lens that stops down to f/11. The shutter speeds range from ½ to 1/200 of a second. Pushing a small knob in the front of the camera slides a built-in filter across the lens. Pulling out viewing frame unlocks shutter. Price: $39.95.

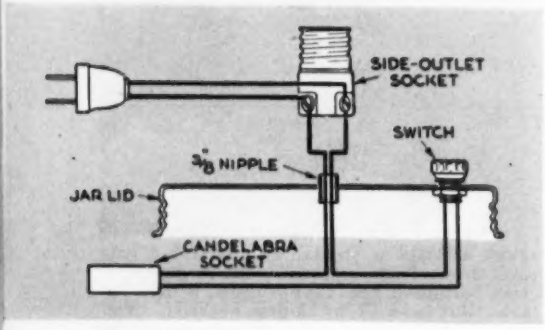


TINY RUBINA closely resembles familiar 35-mm. cameras in design. Above, the back is open, revealing the 16-mm. film magazine. The f/3.5 lens stops down to f/16, focuses from 2′ to infinity. There are three shutter speeds and bulb. It sells for about $20.

EVEN SMALLER is Rubix, with an f/3.5 lens and three shutter speeds. Made in Japan, it sells for about $15. Like Rubina, it uses 16-mm. film, has a 14- by 12-mm. negative. END

Table Lamp Is Fish Tank, Too

A small bulb under the lid of a pickle jar will put your prize fish in the spotlight.



By William F. Morton

THE decorations inside this table lamp are always changing—they're alive. The base, a gallon pickle jar, serves as a fish tank and is illuminated by a 7½-watt bulb hidden under the lid. Above the lid is a conventional lamp.

A jar can usually be had for the asking from a restaurant or grocery store. If you must settle for the narrow-mouth kind, there won't be room to mount a candelabra socket under the lid. In this case, screw a regular lamp socket on the bottom end of the pipe nipple that holds the upper lamp and use a 7½-watt standard-base bulb.

To hide the tank light, the upper part of the jar is painted, first with a coat of white enamel to reflect the light inside, then with a coat of black enamel or other color as desired.

The lower lamp is controlled by a separate rotary switch, wired as shown at left. Tape all connections, and fill the jar no higher than the paint line so water won't reach the electrical parts. Varicolored marbles decorate the bottom of the tank.

MASKING TAPE is first wrapped around jar about 4" below top to make guide line for painting. Simple figures, cut from same tape, can be pasted around jar above line to form silhouettes. When paint is dry, peel tape off carefully.

LOWER LIGHT for fish tank is small 7½-watt, 110-volt candelabra socket, held on underside of jar lid by nut on pipe nipple. Rotary switch is mounted through ⅜" hole at right. Other holes vent heat, permit feeding fish.

ON NARROW-NECK JARS, tank light can be standard socket instead of candelabra. Screw it upside down onto lower end of pipe nipple in place of nut.

UPPER LIGHT is standard side-outlet socket, held on top of lid by ½" length of ⅜" pipe nipple and nut. Omit harp if shade is the type that clips to the bulb.

Angler Carves Model Fish

BALTIMORE businessman R. Russell Swigert likes fishing so much that he has turned it into a hobby as well as a sport. The finely detailed specimen below is one of 60 mahogany replicas he has made of his catches. He works from photos, and scales all models down to a length of 8". To capture the fresh-from-the-water appearance of live fish, he coats a finished carving with aluminum paint, then colors it with transparent photo-tinting oil paints.

If you're itching to join the crowd afloat this year, here's how you can in

A Boat That Anyone Can Build

You can power it with oars or outboard. Neither time nor cost should stop you. About $12 and 16 hours will complete the job.

By Stanley Stearns

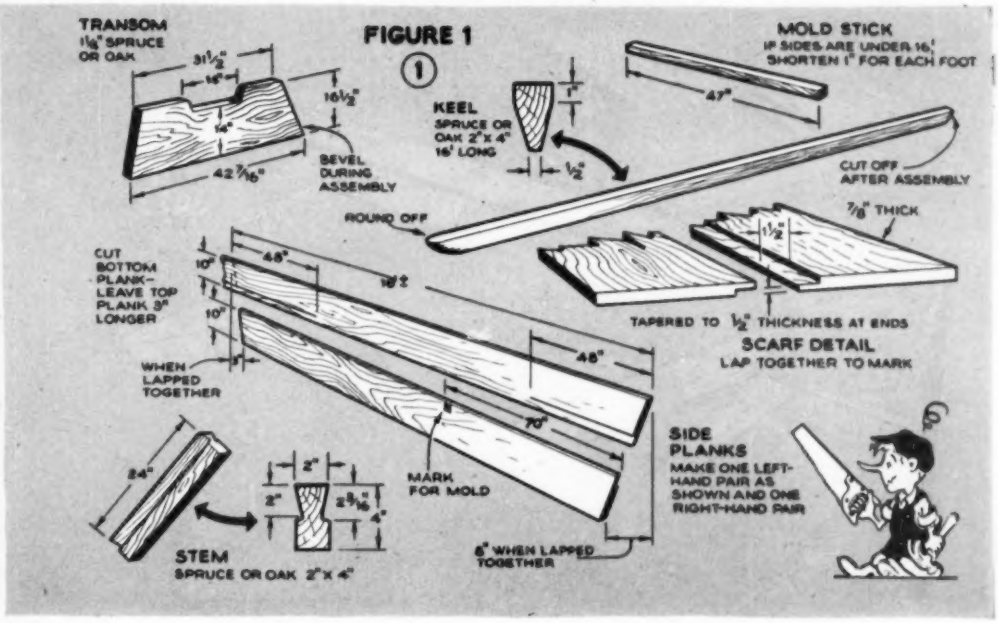
IF YOU are a professional boatbuilder, let your wife cut out this article before you read any more. And don't blow up if she begins telling you what a snap job *you* have. For it's true that anyone can build this boat.

If you are just plain *anyone*, beg a few dollars (about 12), borrow some tools (a hammer, chisel, plane, saw and a heavy drift), buy your materials and steal some time (around 16 hours if you don't waste any of it). You'll wind up with a strong boat that will perform well with any outboard from 1½ to 22 horsepower and will even respond to rowing.

The lack of a framework is the secret of the simple construction. The sides fair naturally around the single mold stick inserted between the stem and the stern. You can bang the job together with about four pounds of eight-penny nails—use galvanized, bronze or copper nails if you're around salt water. In fresh water, plain nails will last 10 to 15 years, but salt water eats them up fast. If you plan to power the boat with a husky outboard, toss in a few screws here and there, where nails can't be clinched.

Check the list of materials and take a look at Figure 1 to see how the parts are chopped out, then chop away.

A rabbet plane is ideal for cutting the scarfs and rabbets (notches) in both the stem and side planks, but it can be done with an ordinary plane, if you clean the corners with a chisel. Do the transom and keel first, if you wish, for morale purposes—you'll need to have something accomplished to forestall snide remarks from your family and neighbors. The stem should present no difficulties. Just shape it and leave the ends until later. The less said about the side planks the better, except to note that the shortest one will determine the length of the boat. Once you know that, the mold stick can be made the proper length. Try to get the front-end angle of the side boards the same on each side of the boat, if you want it to be absolutely straight. Be sure they overlap in such a way that there is a shelf inside the boat on which to rest the seats.



Now for step 2 in Figure 2, which is easy. At step 3, you'll see a little diagram showing how the stem should be lined up at 90°, after you have one set of side boards nailed firmly, and the other side tacked loosely enough to "wee-waw" into alignment. Don't take this too seriously. It doesn't have to be done. Contrary to learned opinion, a crooked boat can go very well with an outboard motor.

Step 4 is where your boat—yours, all yours!—begins to take shape. Pull in the bottom boards, somehow. As soon as they are lassoed and hog-tied in, try the stern in place (just the bottom piece, if yours is in two pieces), and bevel the edges to fit the side boards. Since the bottom edge of the stern piece isn't beveled yet, allow it to drop down as in the detail drawing, slap on white lead and twine, and tack up the side planks.

You're feeling pretty cocky now? Here's a little detail to bring you down to earth. See that innocent-looking string going straight down the center of the boat in step 4? Well, if you're still set on having a straight boat, just push and pull things in relation to the transom until you get the string to fall naturally over the center mark on the mold stick. However, if this aligning looks tough, skip it. Either way, nail the planks down tight.

Next, put your rope around the whole boat to pull in the top side boards. Fit the rest of the transom if yours is cut in two pieces. There need be nothing in the joint between the two, and they need not be nailed to each other. Smear more white lead and twine along the transom and tack

LIST OF MATERIALS

Sides, 4 pieces ⅞"-by-10" pine, 12' to 16' long.
Keel, one piece 2"-by-4" spruce, same length as sides.
Stem, 2"-by-4" spruce, 2' long.
Transom or stern, 1⅛" spruce, 16½" wide by 4' long, or two pieces totaling 16½" width.
Bottom planking, about 120' of ⅞"-by-6" pine or cedar.
Seats, ⅞"-by-10" pine or cedar, about 16' to make four seats.
Trim, 2 strips of spruce, ⅞" by 2", same length as sides.
Mold stick, any piece of scrap 4' long.
Thin sheet metal, 1¼" by 10" for binding sides to transom. Also squares for patching weak spots.
White lead, about 1 lb.; some twine cotton batting or old sheet

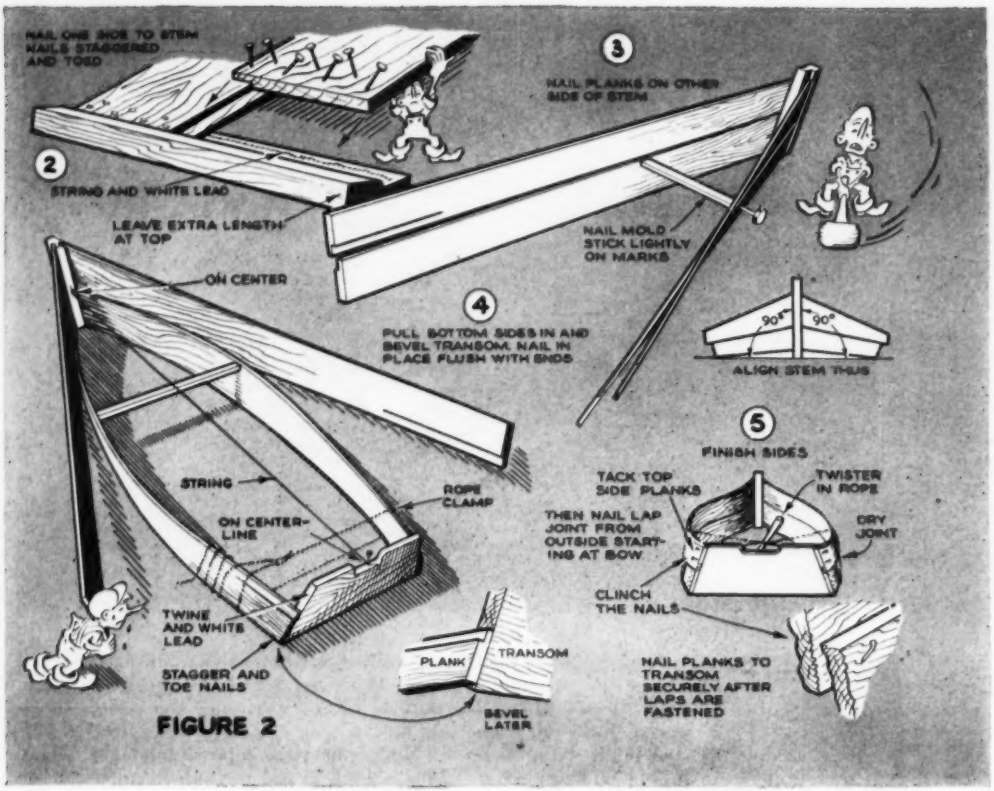


FIGURE 2

on the top planks temporarily, nailing securely after fastening the laps. To do that, nail the side boards together along their whole length through the lap-over as per step 5. To clinch nails correctly, hold a heavy drift, axhead, any piece of heavy smooth metal or a rock against the spot where the nail will appear, and drive the nail all the way in. The drift will curl the point back into the wood. When you find that method doesn't work, pound the nails through, hold the drift on their heads, and bend the tips over with your hammer. If you still have trouble, remember a few hammer marks add character to your work.

Is it beginning to look like a boat? Hah! Turn it over. Bend down, if you still can, and sight along the bottom edges of the sides. Better call them "chines"; that's what they are, and it'll show those neighbors who persist in sneering at your efforts. You will notice that the chines whoomp up in the middle. Cut them down until they look like step 6, with all the curve out of the rear three-quarters of the boat. Be very careful not to get a hollow here; a slight rise is better than that. If you get the bottom perfectly flat, the boat will run well with a motor and will "plane." You ought to try this boat sometime with a 22-horsepower motor just for the big kick you'd get out of it. A slight downward slant at the bow will lift it rakishly when the boat is righted. Bevel the chines, transom and base of the stem so the bottom will fit closely.

Plank the bottom. That means nail on the floor. Don't put anything in the seams

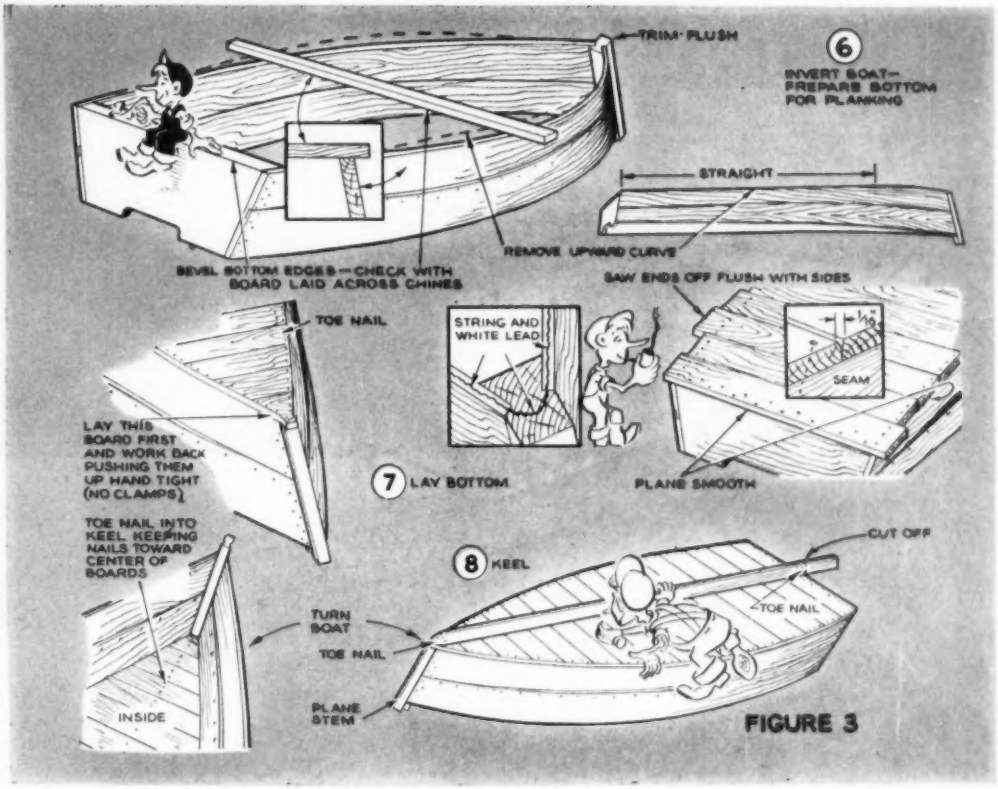


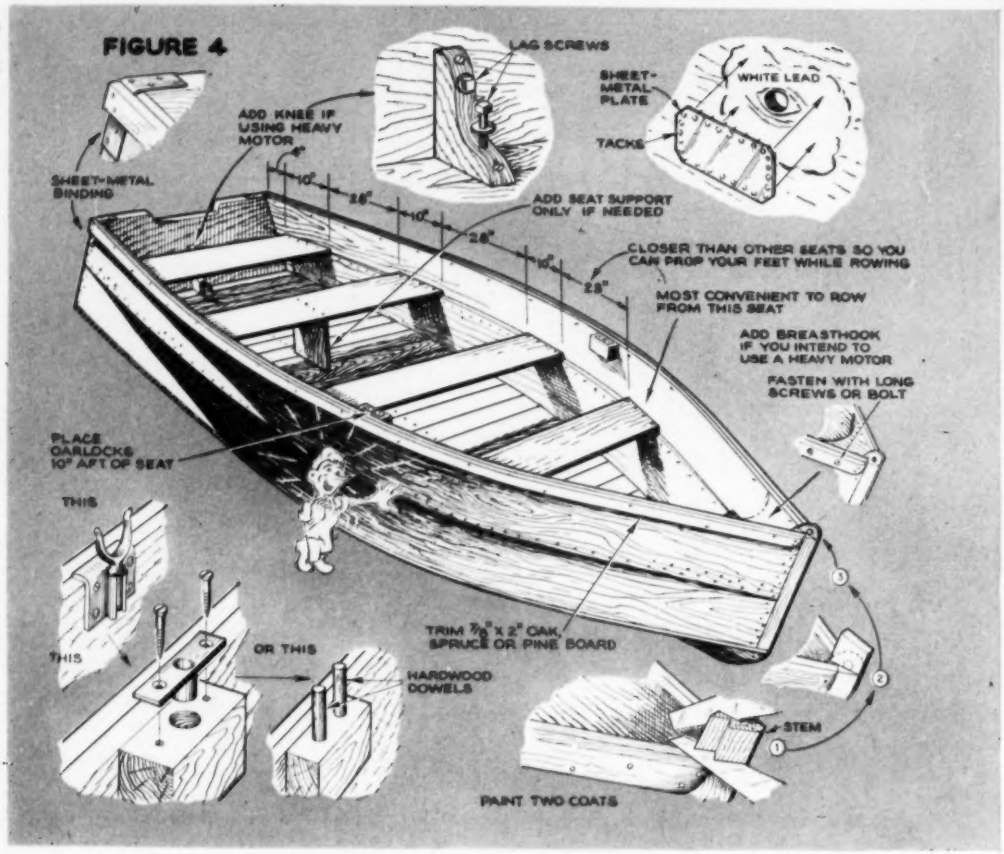
FIGURE 3

between the bottom boards, but do put string and white lead along the chines, stem and across the transom. You shouldn't let long fine cracks between the boards alarm you unduly, but you had better plane the edges to eliminate sharp humps and hollows. Knock one corner off the edges of each board with a plane so that when they are pushed together they will leave a 1/16″ space on the water side, as in detail drawing of step 7. By careful manipulation you can get crooked boards to fit against other crooked ones and won't have to do much of any planing. This is the answer for people who cannot straighten an edge with a plane, or for those who would rather smoke a pipe and look the situation over.

Haggle off all loose ends. Add the keel, nailing it securely to the stem and transom. You might use a few larger nails here. Right the boat. Don't get nervous over this. Flop it over, quickly. It won't get any more crooked now, no matter how you treat it. Peek through the cracks in the bottom to see where the keel is and nail the bottom boards to it along its whole length. This will be fun because you are nailing down and you have lots of leeway; if you haven't learned to drive a nail yet, it will be fine practice.

By this time, you must have begun to catch reluctant gleams of envy in your friends' eyes. At least, they've stopped their sly digs, haven't they? If not, now is the time to go buy a boat and make the substitution in the dark of the night. If you're sticking with the job in self-defense, try to be alone as you struggle through the next illustration, Figure 4. It's the jury-rigging—the makeshift side that you wouldn't like to have publicized any more than you enjoy hearing your wife tell how she started the car with a bobby pin, after you had exhausted the tool kit.

Stroll around the boat slowly enough so

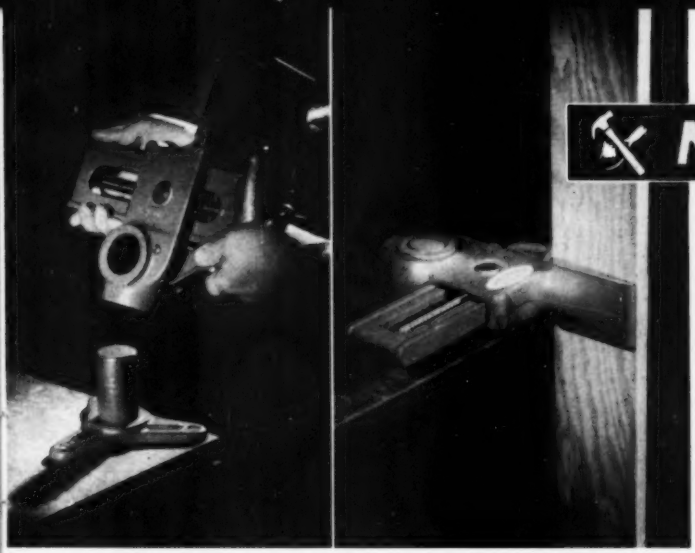


you can break off all the larger splinters. It looks better already. Now fill all the extra nail holes, before you have time to wonder how they happened to be there. Do all patching from the outside. For nail holes, drive in a small stick coated with white lead. Put a sheet-metal patch over the larger weak spots. If you get the bottom and lower two or three inches watertight, the topsides don't matter, so long as everything stays together. The sheet-metal binding at the corners of the transom goes on next, then the seats, oarlocks and trim.

Everything's fairly neat looking now except for that extra length of stem sticking up. Wha' hoppened? Well, it needs to be whittled down, and have a hole poked through it. Then paint the boat. Bright colors will cover a multitude of sins.

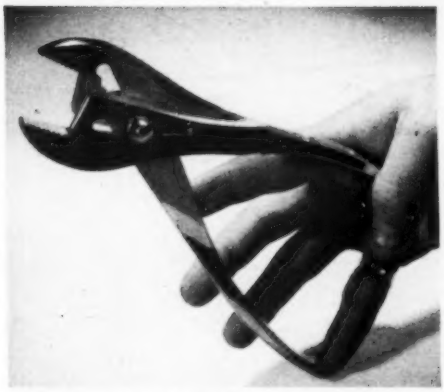
Now for launching; we'll slide over this quickly—it's rough. Sometime when no one is around, sneak the boat down to the water. Steel yourself. Push the boat in. Beware of the suction as it plummets to the bottom. Keep calm. Fly out of there. Act like it never happened. Return the next day and bail it out. If you find you can't make any headway against the inrushing water, wait another day. Pull the boat out, empty and relaunch. This time, mark any places that still leak. You may have to be fast at this, especially if you can't swim. Yank the boat out once more and stuff the places from the outside with more little sticks or cotton, using a hammer and screwdriver. When it dries, cover it with two coats of porch enamel—two quarts should do it.

Now you have a fine dry boat of your own and can call yourself a boatbuilder. You'll enjoy it a great deal if your friends ever give you a chance to use it yourself. If they don't, maybe you can find the lake where there are several hundred rental jobs just like it—all floating, too. END



New Tools

1. Vise Works in Any Position. Slip this vise on its base post one way and it stands upright; turn it on its side and it holds large stock vertical or flat pieces horizontal. In either position, it rotates in a full circle and locks automatically as the jaws are tightened. A swivel attachment is also available that permits the vise to tilt at any angle. Vise jaws open to 5"; weight is 16 lb.



3. Pliers Multiply Grip. An extra linkage in these compound pliers multiplies the force on the jaws 10 times, enabling you to grip hard-to-hold work that would normally pry the pliers out of your hand. The jaws can be set to four positions, with a full opening of 1¾", and have a parallel action that applies even pressure.

2. Split-Tip Blade Holds Screws. The blade of this screwdriver is split like a pair of scissors. Squeezing the tips together lines them up so they enter the screw slot; letting go then spreads the tips under spring tension, tightly gripping the screw while you start it in a hole and drive it.

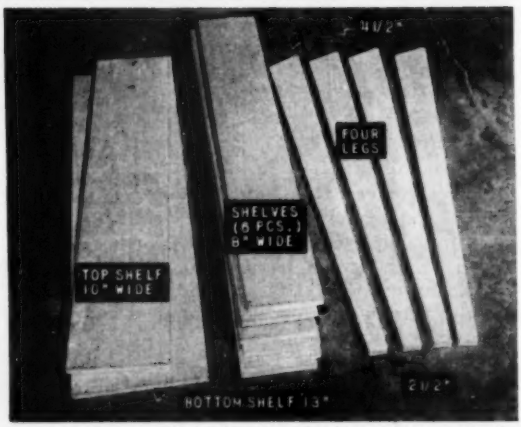
4. Screwdriver Has Four Blades. Two sizes of flat blades and two of the Phillips type are combined in this four-sided screwdriver. Each pair of blades also acts as a handle for exerting extra leverage on hard-to-drive screws and for fast spinning when removing or running in screws.

Further information on the items described above can be obtained from: 1. The Columbian Vise & Mfg. Co., 9021 Bessemer St., Cleveland 4, Ohio; 2. T & T Products, 1562 DeKalb Ave., Brooklyn 22, N.Y.; 3. P & C Hand Forged Tool Co., 32nd and Llewellyn, Portland 4, Ore.; 4. Eklind Tool & Mfg. Co., 2627 North Western Ave., Chicago 47.

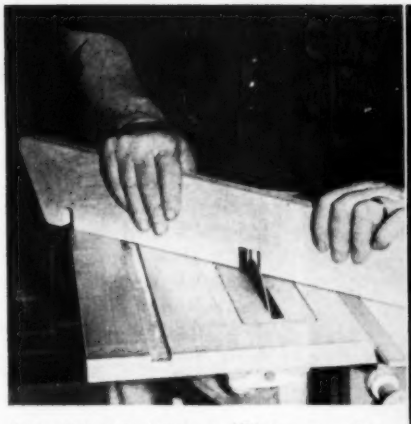
A handsome project for the living room:

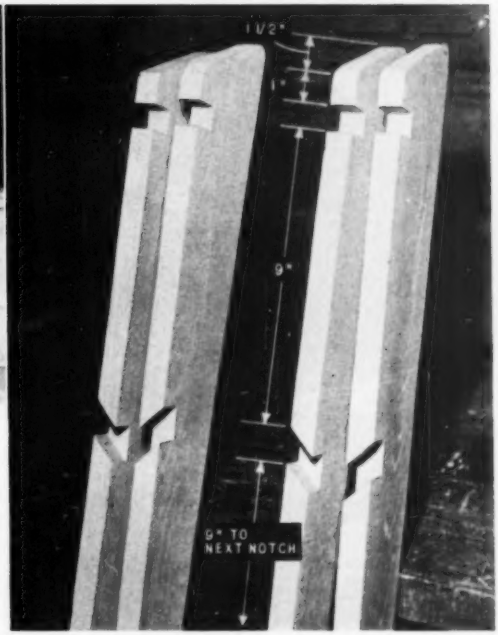
Tilt-Shelf Book Rack

It holds magazines, too, at an angle that makes the titles easy to read.



ALL PARTS are of 1" lumber, 13/16" thick and 48" long. Legs are tapered on the outside edges.

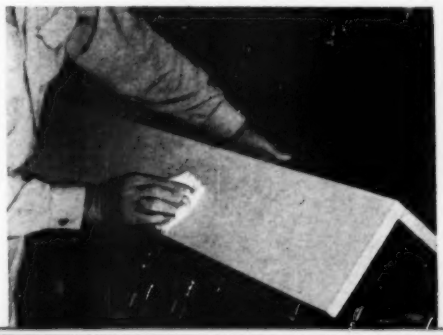




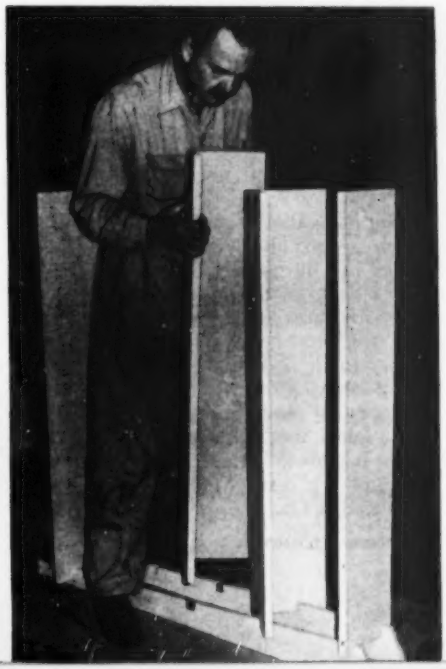
CUT SHELF NOTCHES at 45° in opposite directions in each pair of legs. Use a shelf to check notch width for a close fit. Cut one square notch for the top shelf, then three angled notches 9" apart, and another straight one 7" farther down for the lower shelf. Saw tops of the legs at an angle and round off the corners. For holding books only, omit the bottom shelf and space others out by cutting the notches 12" apart.

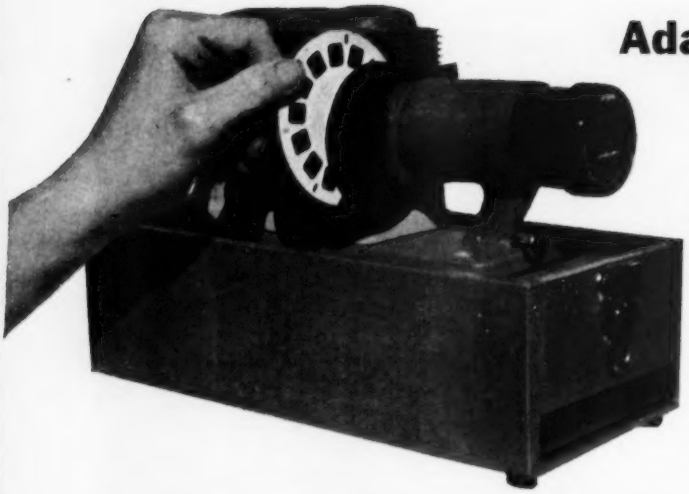
APPLY GLUE to one edge of an 8" board and nail another to it with finishing nails like this. Wipe off surplus glue before setting aside to dry. Make three such shelf units.

FINISHING IS EASIER if done before the case is assembled. Ash wood used here was given a modern blond finish by coating with white filler, letting it dry a few minutes, and then wiping lengthwise with the grain. Cracks and nail holes were puttied beforehand.



PLACE TWO LEGS on the floor, notches up, smear glue into the notches, and insert the top and bottom shelves. Then drive the angle shelves into place, using a wood block under the hammer. Fit the other legs on top. Nails may be driven from under the straight shelves into the legs. If notches are a good fit, the unit can be assembled without glue and held with hooks and eyes in back, making it easy to take down for storage. END



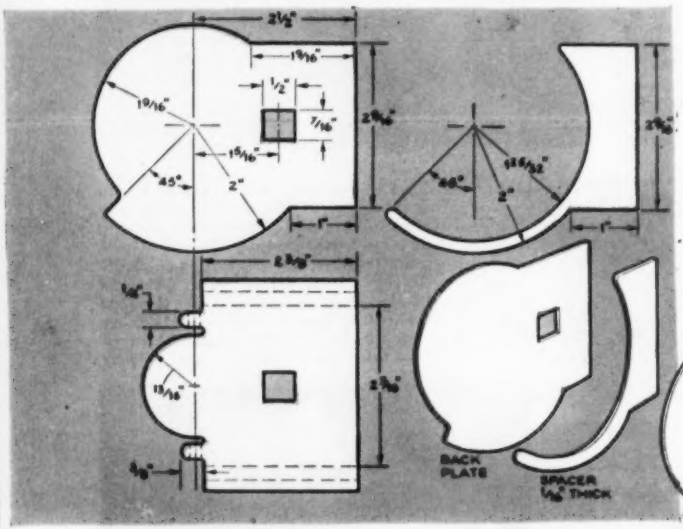


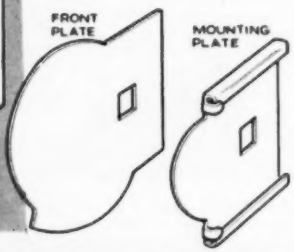
Adapter Projects Color Reels

EVEN if you shoot your own color, you've probably seen those small, inexpensive color reels, available for scenic spots all over the country, and wished you had some way to show them. With this simple adapter, you can show the reels in any standard 2"-by-2" slide projector, saving many times the cost of full-size slides.

The parts can be made of sheet brass, tin plate or aluminum, cut as shown and soldered at the edges (rivet if aluminum). The adapter is slipped on the projector in place of the regular slide carrier and the reel rotated by hand.

Every other picture is a duplicate and will appear on the screen upside down, so just pass quickly over these and there'll be no snickers from the audience.



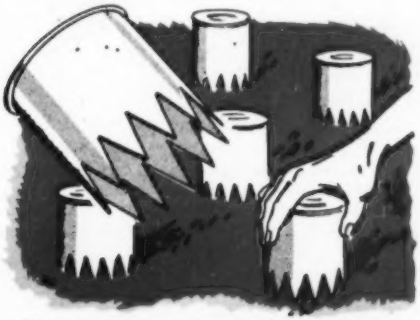


Guide Aids Enlarging

SPIN this dial to a known exposure, and all new exposure times can be quickly found for any change in magnification or lens aperture during enlarging. By applying density measurements to the guide, it will also compute exposures without making tests for every print and will help select the right paper for each negative. The Enlarging Dataguide is made by the Eastman Kodak Co.

KEEPING THE Home SHIPSHAPE

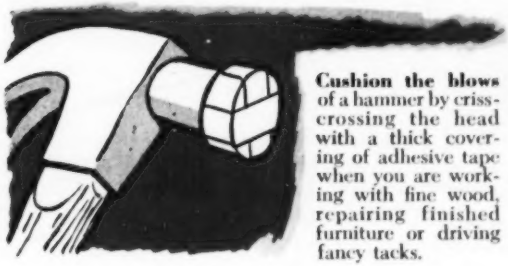
Nose a card table into a stall made of coat hooks and it won't slide to the floor when stored behind a door or against a closet wall. A pair of doorstops screwed into baseboard or floor will do the same job.



Tin-can frost protectors for small plants need not be weighted with rocks if teeth are clipped in the open ends. Some air will reach the plants if the teeth are not driven too deep into the soil.

Fraying rope ends rot easily when exposed to the weather. To lengthen the life of clothesline and other rope used outdoors, bind the rope ends together permanently with brass distributor-wire clips.

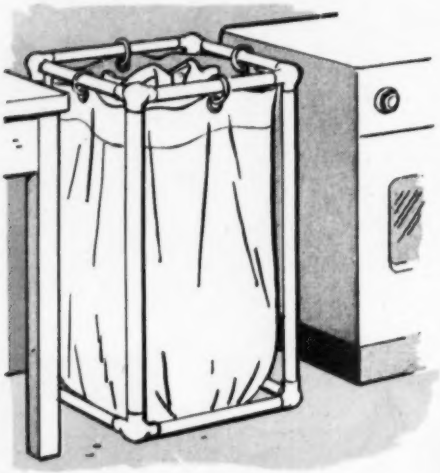
If a door sticks during wet weather, apply paraffin wax to the edge and to the jamb which meets it. The door will then be easier to manage until dry weather causes the wood to shrink again.



Cushion the blows of a hammer by criss-crossing the head with a thick covering of adhesive tape when you are working with fine wood, repairing finished furniture or driving fancy tacks.

Please turn the page for more home tips.

More Home Tips

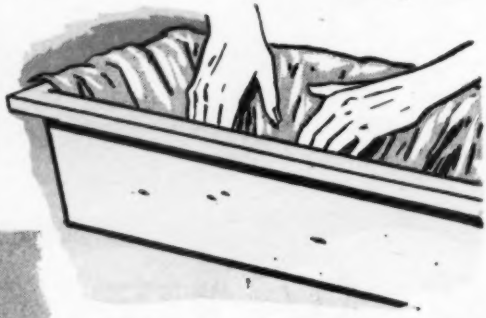


A barracks bag hung with shower-curtain hooks on an iron-pipe stand makes a good hamper for a basement laundry. After wash-day, attach a clean bag on the stand to hold clothes awaiting ironing.

When shortening a bolt, screw on the nut before cutting into the threads. Then, when the nut is unscrewed, it will act as a die to smooth any ragged threads at the end.

On rainy days, provide a parking spot for the family's rubbers and overshoes. A metal tray or a cookie sheet near the entrance door will catch drips and cut down mopping.

To dust pillows, empty the feathers on a sheet, cover them with a screen and vacuum over the mesh. Change to a clean bag liner, suck up the feathers and dump them back into the ticking.



Building window boxes? To prevent wood rot, line them with heavy-duty aluminum foil before filling with soil. Fold the foil carefully at the corners so there are no tears exposing the wood.

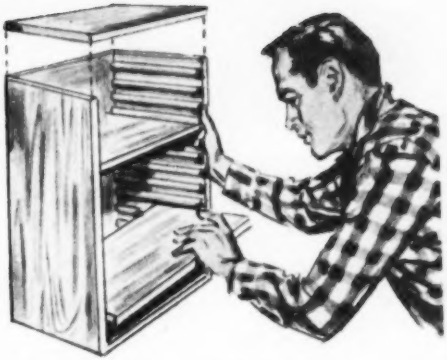
Felt Quiets Singing Guy Wires

ACTING like a finger on a vibrating violin string, a strip of heavy felt wrapped around a TV-antenna guy wire will damp vibration and lessen the tendency of the wire to "sing" when the wind blows.

Wrap a strip 6" to 12" long in a spiral around each wire halfway between the top and bottom. Secure ends with tape.

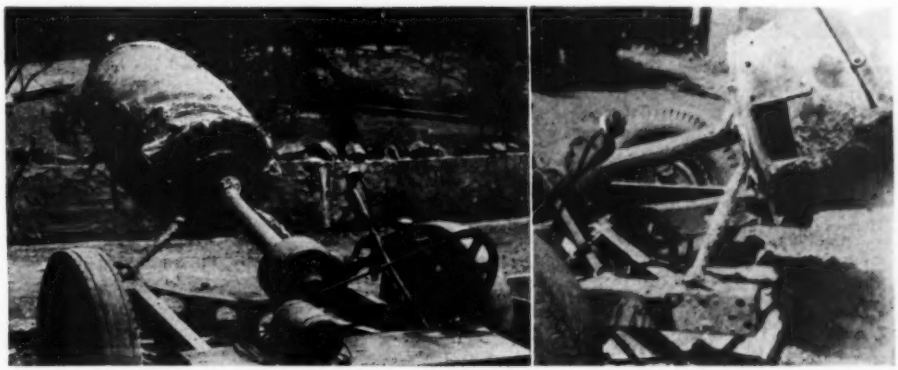
Container for Touch-Up Brush

A CHEAP oilcan makes a handy touch-up paint can or small-parts cleaning unit. Unscrew the spout from the can, saw off near the hilt, and slide the brush up into it from the bottom side. Tape it if necessary.—*Ken Olin, Marquette, Mich.*



Corrugations Hold Shelves

You can make the shelves for your shop cabinets adjustable by fastening a piece of corrugated roofing to each side of a cabinet. Cut roofing the height and depth of the cabinet. Shelves, slightly rounded at each end, will slide into the corrugations.—*B. C. Vaughan Jr., Springdale, Ark.*



Model-A-Ford Parts Converted into Handy Cement Mixer

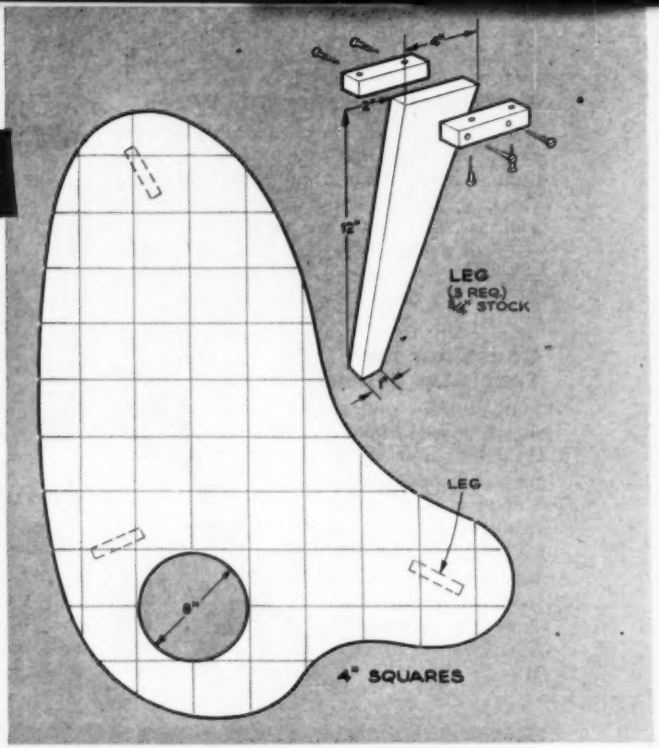
JUNK Ford parts that are no longer roadworthy can still see plenty of service mixing cement. The mixer above is an assembly of parts that requires no machining and only a little welding.

It is built on a section of a frame mounted on a front axle without springs. A plank bolted across the frame supports a ⅓-hp., 1,725-r.p.m. motor fitted with a 2" pulley. Power is transmitted through a V belt to a 12" pulley mounted on a worm-gear reduction box. A flexible coupling links this to the pinion shaft in the differential of half a rear axle. A Ford wishbone is used to support the housing of the axle.

Up at the mixer end of the outfit a rear-wheel brake drum is bolted on the axle and a 50-gallon oil drum is welded to it. A sheet-metal door, operated by a short lever, slides in two guides to cover the pouring opening while mixing. The mixer is controlled by a heavy-duty switch mounted on a bracket near the drum. A length of 2" pipe fitted with a trailer hitch permits towing the mixer to the job.

Capacity is about two wheelbarrow loads, and mixing time is about five minutes for each batch.—*S. White, Forestville, Calif.*

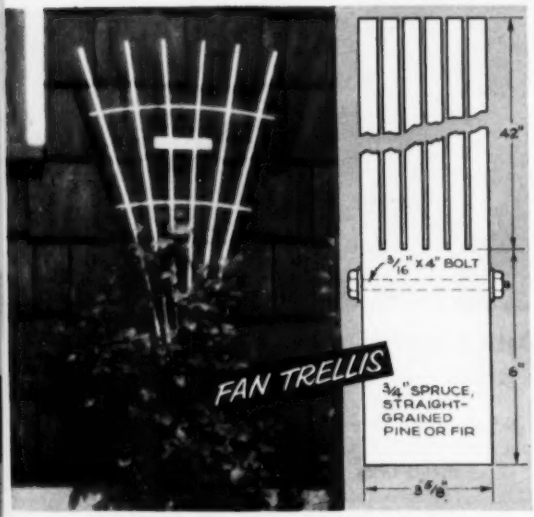
One Evening Shop Projects



Smart as it looks, the table on the opposite page can be built in about four hours. The cutout will hold either a potted plant or a bowl for fruit or snacks.

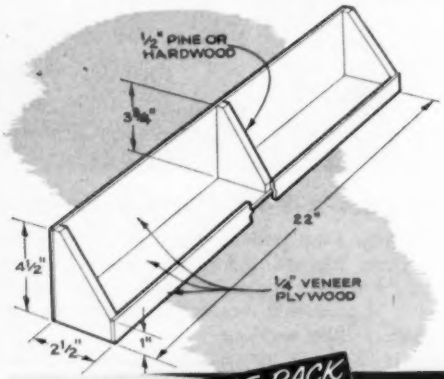
Drawn on 4" squares, the pattern will be about 32" by 44". Use larger or smaller squares to get the size desired. Cut the hole to fit the container you wish to use.

The legs are held by small blocks secured to the underside of the top with glue and 1¼" No. 8 screws, staggered to avoid interference. A natural lacquer or varnish finish with a black edge is good in modern interiors. *—R. T. West, White Plains, N. Y.*



Climbing plants will just naturally take to this trellis. Rip five evenly spaced kerfs in a straight-grained ¾" board 4' long. Tighten a bolt across below them to prevent splitting. Pull the ends 4" apart and nail on spreader strips bent to a curve. Paint white for contrast, or green to blend with foliage.*—Hi Sibley, Nuevo, Calif.*

Mounted near the oven, this rack keeps spices in cooking reach. Use veneer plywood for a grained finish, fir plywood for a painted one. Cut the middle brace lower than the ends to fit inside. Glue and nail. *—W. R. Patjens, Spanaway, Wash.*

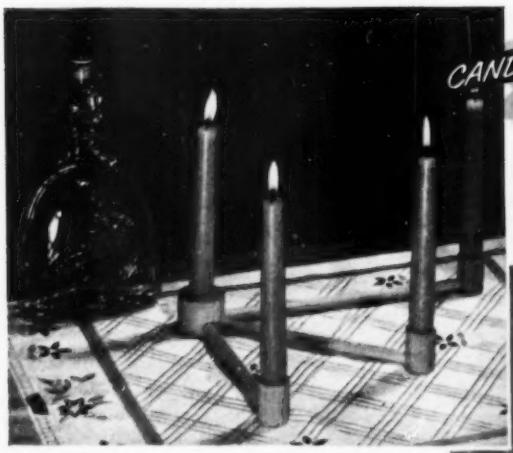


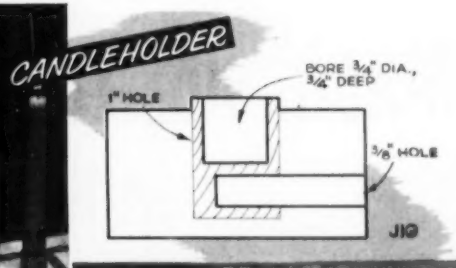
SPICE RACK

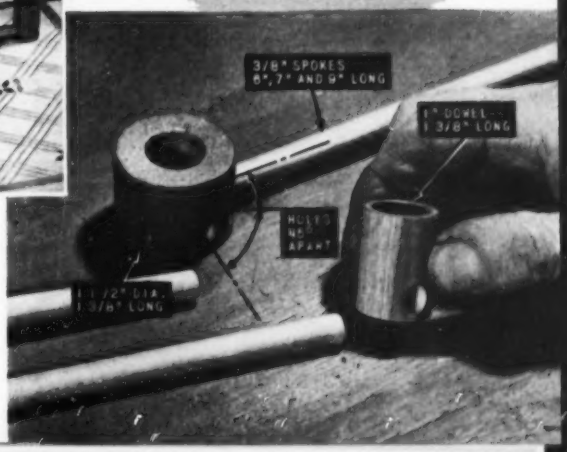
Bore a few holes in some scraps of maple doweling and you have a provincial-style candleholder. A simple jig makes it easy.

Cut the socket pieces square and to length. Push each one into the jig, drill the spoke hole, insert a ⅜" dowel to keep the piece from turning, and bore the ¾" hole, centering it carefully.

A similar jig can be used to bore the spoke holes in the hub socket. Make a mark on it and the block, and turn the piece 45° between holes.—*Walter E. Burton, Akron.*







LARGE HUB SOCKET can be 1½" dowel, a bit of handrail stock or curtain pole, or even a square or octagonal block instead of round. For a natural finish, simply wax and polish after sanding the parts smooth.

You can learn some new tricks by

Machining Your Own Milling Attachment

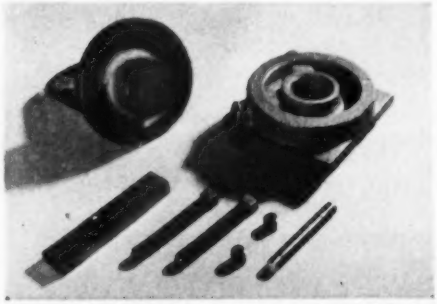
By Harry Walton

YOU do not begin to get full use from a lathe until you have a milling attachment. With it you can do slotting, keyway cutting, gear shaping, slitting and grooving. You can saw stock square or at angles, and spot holes in work with pinpoint accuracy.

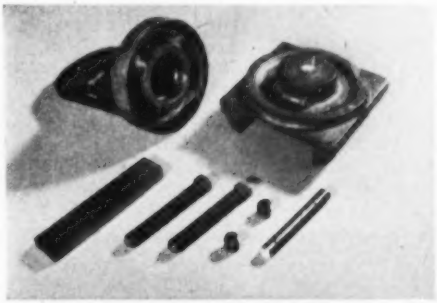
A milling attachment costs a handful of folding money. But here is one you can make from two castings. They cost about a fourth what a finished attachment would. Machining them is fun, and may even teach you a few handy dodges. For instance, you mill parts of the castings to make the attachment you're going to mill with!

When finished you have a husky, well-designed lathe accessory that will not let

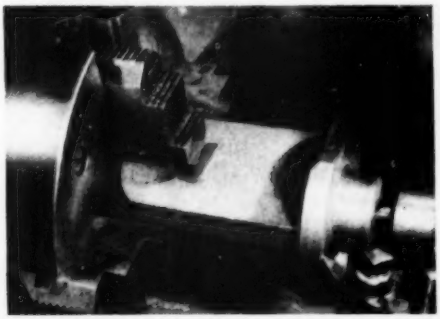
Two kinds of castings fit different compound mountings



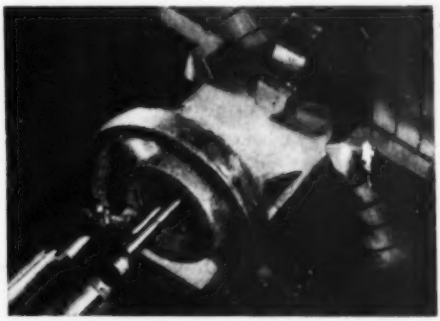
HERE ARE CASTINGS for a popular 9″ lathe having the dovetail post on the underside of its compound rest and a recess in the top of the cross slide. The base casting (at left above) therefore has metal for a similar post, while the vise casting to right of it has a cored hole to be bored out for a recess.



OPPOSITE TYPE of castings will fit a popular 10″ lathe, which has the dovetail post on top of the cross slide and a recess to fit it in the compound rest. The base casting (at left above) therefore has a cored recess. Vise casting has metal for a post. Kits include screws and stock for vise jaw and locking pins.



GRIP THE BASE in a four-jaw chuck if available, centering it to make round end run fairly true. A universal chuck can be used by laying a bar of suitable thickness across two jaws. Centerdrill the outer end deeply and engage the tailstock center to support it.



TURN A 60° POINT on a ⅜″ rod. Chuck the base casting, centerdrill deeply, and support it with the pointed rod in the tailstock. Bore recess a close fit on the cross-slide post. For the offset tool shown, clamp a bit with a setscrew in a hole drilled across a ⅜″ bar.

ROUGH OUT with a fairly deep cut at low speed to get under casting scale. Swing the compound rest to 30° and turn post to same shape as that on the compound. Face off the bottom to leave post the same height also. Finally, turn outer rim of the base true.

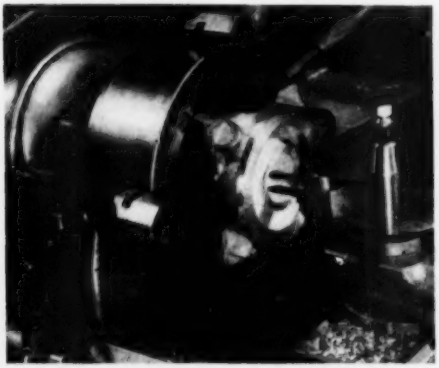
FACE OFF with a cut straight across from recess to rim. Be careful not to remove much metal after first deep cut to get under scale, or recess may become too shallow for the post. Recess is cored deeply enough not to require facing inside if carefully machined.

you down. The castings are plenty rugged, and there is only ⅞″ overhang between the outside of the vise and the base. This remarkably small offset reduces the tendency to chatter, which otherwise means milling at a snail's pace with light cuts, or getting a rough finish.

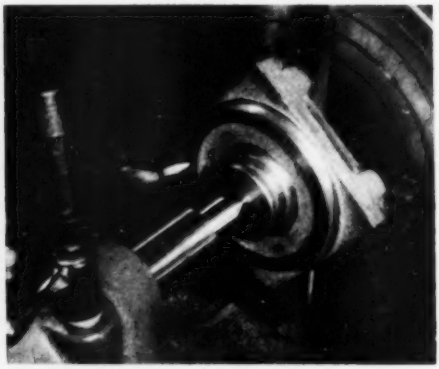
The jaws are 3½″ wide and they open to 2″. Both the vise and the base can be swiveled for angular milling, as shown in the large photo on page 214.

What makes construction easy is the neat trick of using the compound rest for the vertical milling feed. The base casting fits on the cross slide, the compound is clamped on it in an upright position and the vise is mounted on the compound. Castings are available* for 9″ and 10″ lathes, and for both the common compound mountings. To check yours, just take off the compound.

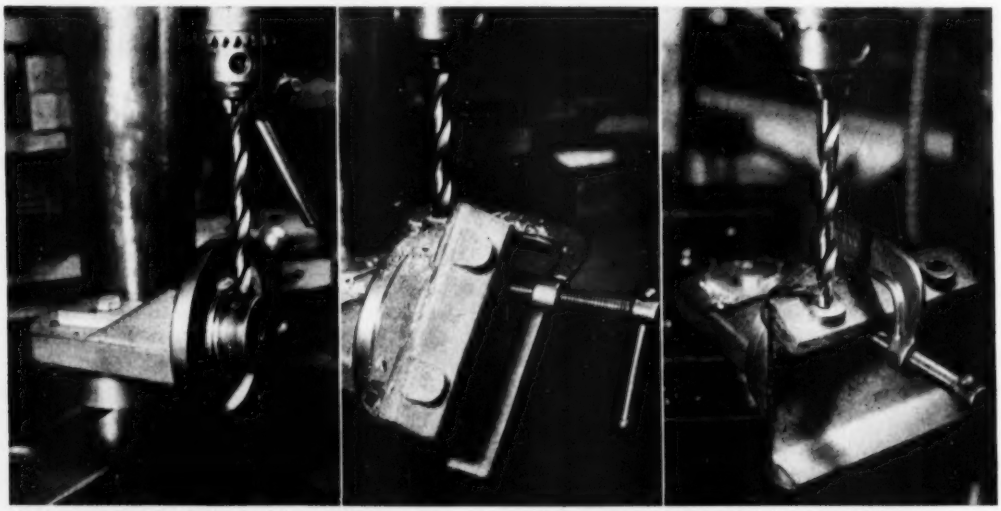
*Sold by Floyd McGuckin, 314 N. Monroe Ave., Ridgewood, N.J.; $7.50 postpaid.



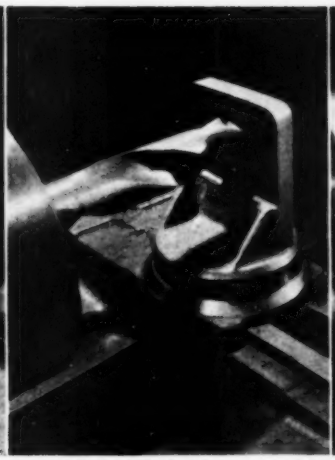
VISE CASTING can be gripped with chuck jaws either outside as above, or inside its own jaws as at right. Bore the recessed type a close fit for the compound post. Then face off, taking care to leave recess deep enough.

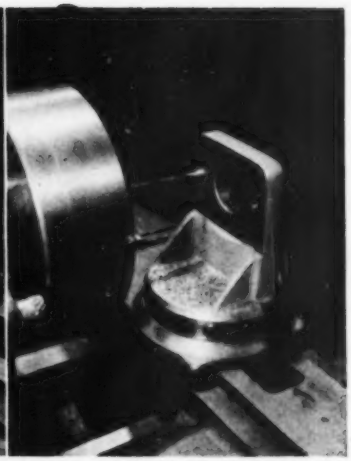


OTHER TYPE of vise casting is first center-drilled for tailstock support. Then the compound is swung to 30° for turning the post to a duplicate of the one on the cross slide. Facing (above) completes work on this side.



MOUNT POST-TYPE BASE on the drill press as above, align drill on the slope and set the depth stop short of it. Clamp the vise on as in the center photo. Drill 5/16″, remove vise to drill into recess, and tap ⅜″-16. Then reclamp the vise on the base to drill screw holes through the bosses provided (right above). The recess type of base is itself tapped for screws. Cut and shape locking pins, chamfering 60° corners to prevent burring.

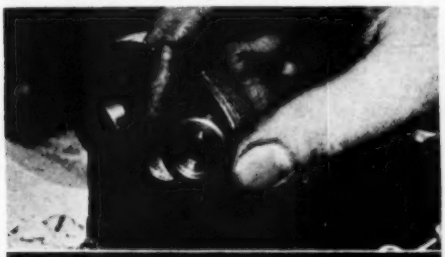


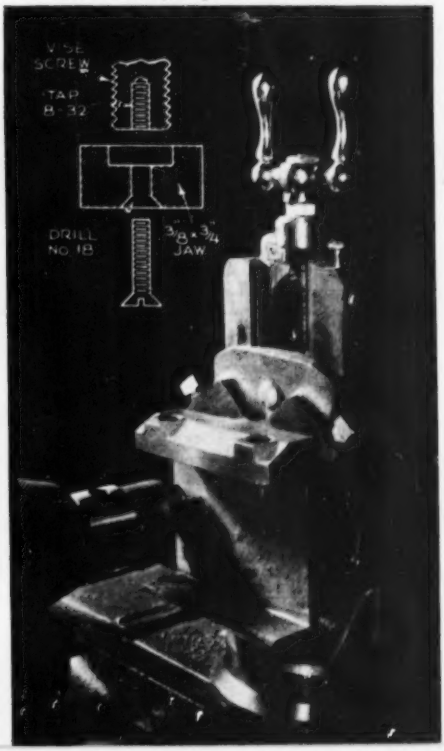


MOUNT THE BASE on the cross slide with locking pins and screws, web side toward the spindle and square to the ways. Chisel a mark at zero and any other graduations wanted. Set a fly cutter to swing just above the webs. Face by advancing the cross feed (left above). With a big drill or a fly cutter, make a hole to fit the lathe tool post in the center of the faced side. Then drill a No. 7 hole 3/8" from each edge as at right above and tap 1/4"-20.

TURN TWO BUTTONS from steel rod to just enter the narrow part of the compound slot. Drill them 1/4" and recess for the screws that hold them on the faced upright, as below. Slip the tool post through the large center hole from the headstock side. Then slide the compound slot over the buttons and the foot of the post as in the bottom photo. Tighten the tool post against a tool holder slipped into its slot on the right-hand side.

MOUNT THE VISE on the compound rest, its jaw horizontal. With a milling or a fly cutter, face the inside as shown below, using slow speed and feed. A straight milling cutter is good for machining the lower jaw. To attach a movable jaw to the vise screws (handier than a loose piece) grind the screw ends flat to get under casehardening. Then drill and tap them 8-32. Drill, counterbore and countersink the jaw piece as shown. END





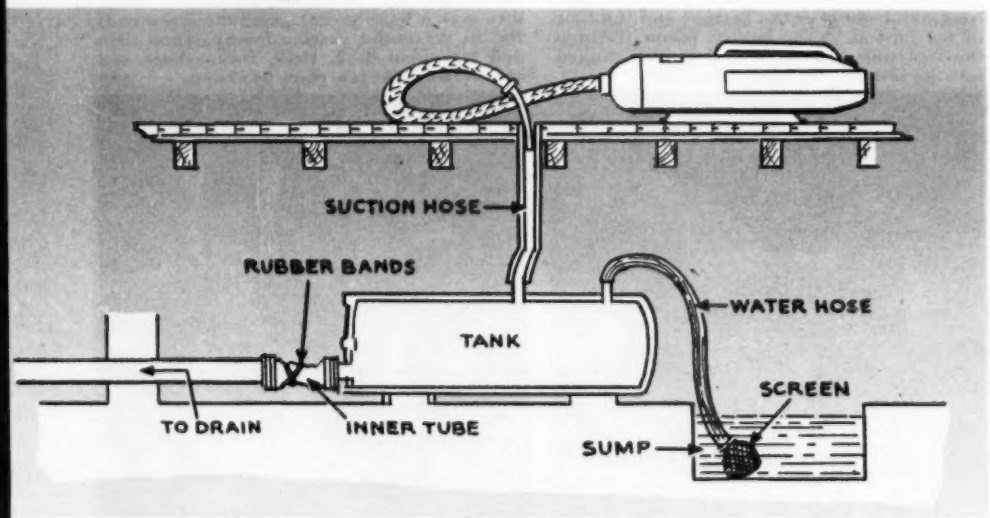
Two Ways to Pump Water with a Vacuum Cleaner

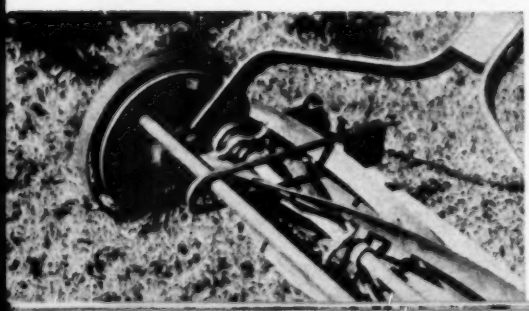
For a quickly rigged emergency pump, Frederick H. Martens of Plainfield, Ill., suggests using a vacuum cleaner and a spouted kerosene container or five-gallon can.

Jam the vacuum-cleaner hose over the spout or filler neck and seal it with tape. Push a piece of garden hose well down into the tank through the other opening (make a second one if necessary) and seal it also. Check the level in the can often. Empty it when water comes near the top.

J. P. LaPoint of Buckroe Beach, Va., uses a vacuum cleaner to drain a furnace sump. An old hot-water tank was laid flat on the ground and hoses were run from two upper openings, one to the sump, a larger one up through the floor to the cleaner. At the bottom of the tank there is an improvised check valve—a piece of inner tube pinched together lightly by rubber bands.

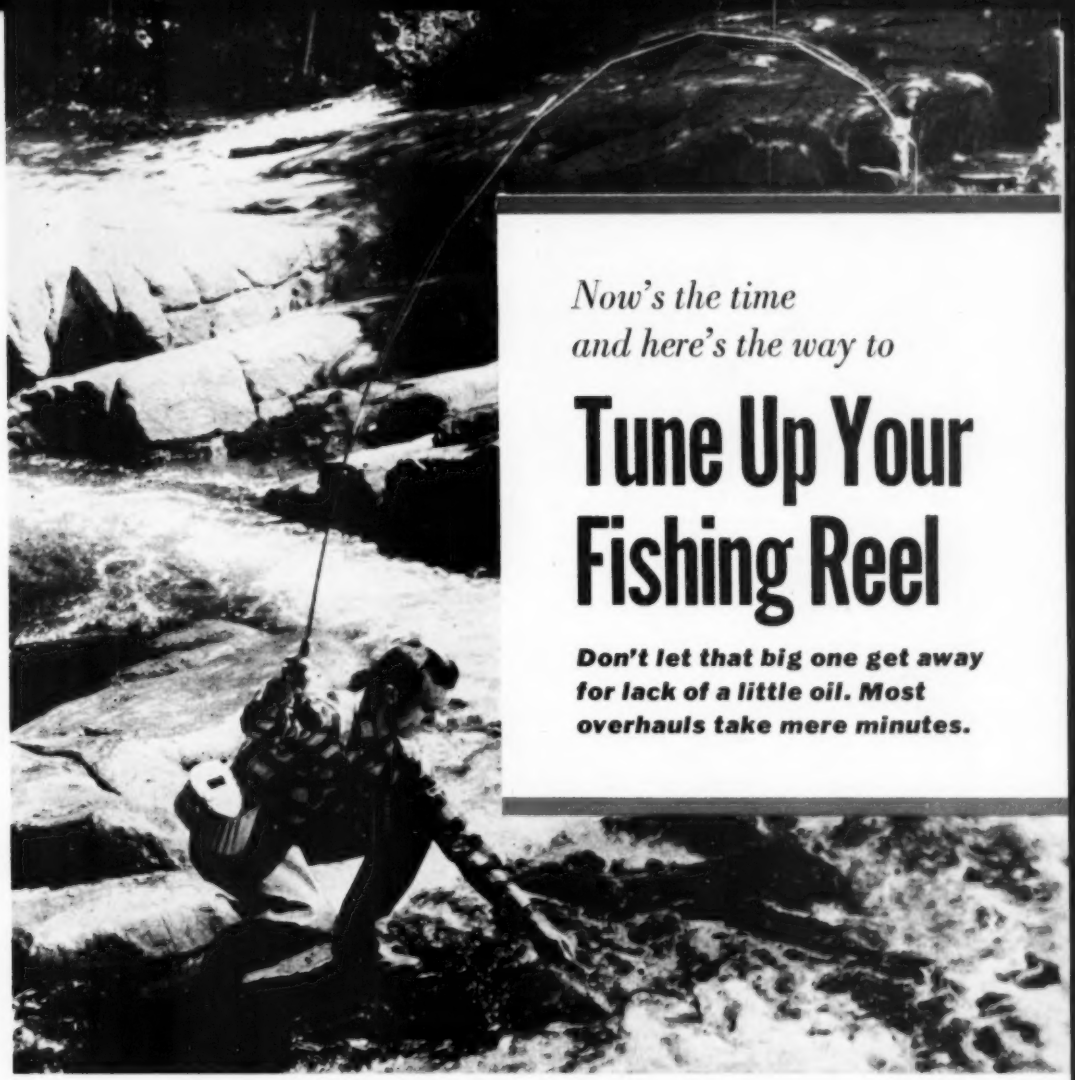
With the cleaner on, suction collapses the inner tube so that no air can enter; water is drawn from the sump. With the cleaner off, the valve opens and water drains out.





Lock Guards Lawn Mower

Youngsters won't be able to move your lawn mower if you lock it (left). A bicycle lock placed over the bar and one blade will prevent cut fingers and ruined flower beds. —*W. H. McClay, Pasadena, Calif.*



Now's the time and here's the way to

Tune Up Your Fishing Reel

Don't let that big one get away for lack of a little oil. Most overhauls take mere minutes.

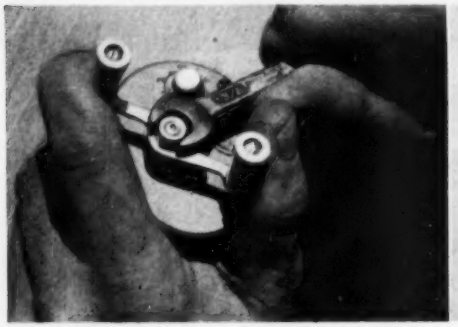
By Jack Wilson

I KNOW. You're dreaming of those long, looping casts into the lily pads when the mist rolls off the lake like balls of cotton and the predawn chill makes you glad you put that extra sweater on.

Well, if you want to make those dreams come true, now's the time to take an early-season look at the fine, precision piece of machinery that's going to do most of the work—your reel. Gritty, grime-gummed gears, sluggish after the long winter lay-off, aren't going to get your line off the ground, and a faulty friction drag will net you only a nasty backlash. A spring tune-up now will unlimber your reel and keep it humming happily all summer long.

Types of reels. Most common of the three basic reels is the level-wind bait-casting rig, used for bass, pike, pickerel and other fresh-water fish. Its critical parts, the spool and worm-driven line shuttle, put out an astonishing number of r.p.m. on a fast, hard cast and must free-wheel smoothly if you're after real distance. The fly-casting trout reel, not shown here, is essentially just a spool for line storage and is thus easily serviced. For cleaning and lubrication, follow the general rules for other reels.

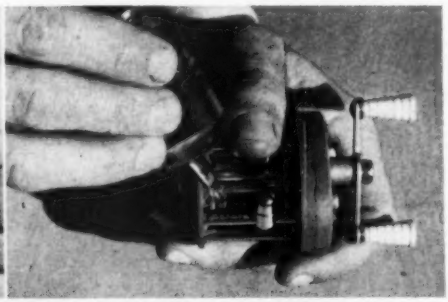
The star-drag salt-water reel, which can



START TAKING REEL APART by unbolting crank handle. Removing screws around edge of reel will then release right-hand side plate and line spool. Leave left-hand plate intact.

RIGHT-HAND SIDE PLATE, which contains main parts, is scrubbed with household cleaning solvent and brush to get in cracks. Stop here unless inner parts need replacement.

GEARS, such as this spool pinion, should be packed with grease, not oiled. When all parts have been put in shape, reassemble reel and spin it several times to work in lubrication.



LUBRICATE REEL before and after every outing as well as at seasonal overhauls. Oil worm gear from underside of reel (above), and fill oil holes at main bearings on side plate.

hurl a lead lure the length of a football field out over rolling surf, is a delicate, high-strung bundle of gears, springs, pawls and ratchets. Approach it with awe, reverence and two strong hands ready to catch any small, wayward parts. You can breathe easier with a spinning reel, newest comer to the sport, which is a sweet performer in either fresh or salt water and needs care at only a few points.

Lubrication. The general rule here is grease on gears, oil on bearings. Two exceptions are the level-wind worm, which should get oil although it is a gear, and the handle-knob post, which should get grease although it is a bearing.

Special reel greases and sperm-base oils are available at tackle stores and should be used in place of ordinary household lubricants, which offer too much friction and will not stand up as well under the deteriorating action of water, rust and corrosion.

Tackling the hard parts. Unless you have an awfully good memory, putting together some of the more complicated reels such as the star drag may seem like a puzzle with too many pieces. If a diagram came with your reel, study it carefully to make sure you know what each part is and where it goes. If not, you can use the find-your-way-out-of-a-maze-with-a-ball-of-string method, listing and numbering the parts as you take them out. Reassembly of the reel will then be a simple matter of putting back the parts in reverse order.

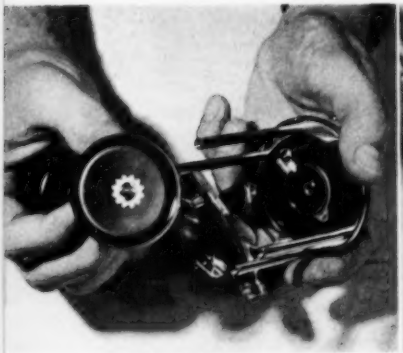
If you don't want to go all the way, you can stop at one of the main subassembly divisions, as shown in the photos, and turn the rest of the job over to your tackle store's reel repairman. In any case, your reel should get a complete tear-down and overhaul at least once a year.

Star-Drag Salt-Water Reels Need Extra-Careful Handling

SPECIAL WRENCH has sockets that fit bolts on reel. Start disassembly by removing lock screw on crank; then unbolt crank as shown. File down screwdriver tip if it's too blunt.

DRAG STAR is unscrewed next. Nipple in center of side plate is oil hole for right-hand end bearing; the one to left above it is for the driving gear. *(Please turn the page.)*

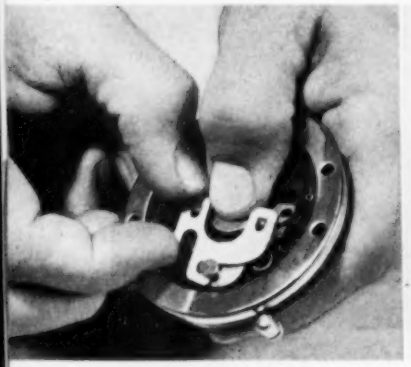
More Tips on Putting Your Surf-Casting Rig in Top Shape



REMOVE SCREWS at edge to release right-hand side plate and spool. Flush parts with solvent, then recoil gear, click tongue and spring. For temporary overhaul, stop here.

NOW IT GETS TOUGH. To reach inner works, remove four remaining screws in right-hand side plate. Be sure to hold assembly where you won't lose small parts that may drop out.

GEAR BRIDGE lifts out when screws are removed, exposing clutch mechanism. Tip plate over in palm, and pinion gear, dog spring and dog will drop out. Clean these and regrease.



TO REMOVE PINION YOKE, push it down with left thumb and slide eccentric jack to the right to free it. Yoke will then lift—or pop—out, along with two clutch springs.

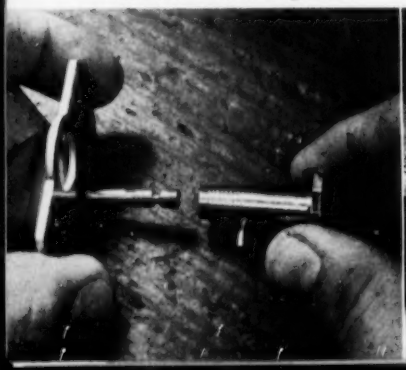
ECCENTRIC SPRING (pencil point) is hard to take out, harder to put back. Better leave it in place unless either it or eccentric needs replacement. Clean and oil.

DRAG DISKS are metal and leather washers. Keep all parts dry and replace leather disks that have become oily or brittle. If spring washer (left) has flattened, rebow it.

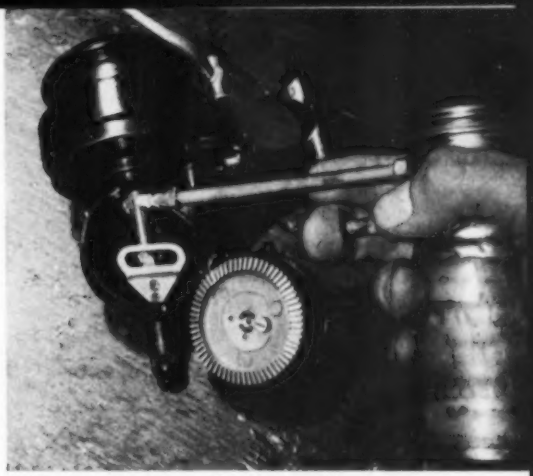
RATCHET BUSHING (right) will stick to steel post (left) if rust forms. Tap out lock pin, soak joint in penetrating oil, then clean post with steel wool and coat with grease.

GREASE DRIVE GEAR after assembling star drag, taking care not to get any on disks. Also grease clutch springs and spool pinion gear. Reassemble reel, crank several times.

AT END OF EACH DAY'S fishing, wash out salt water with warm fresh water, then dry reel and lubricate oil holes at bearings. Wipe metal parts with soft oily cloth to protect finish.



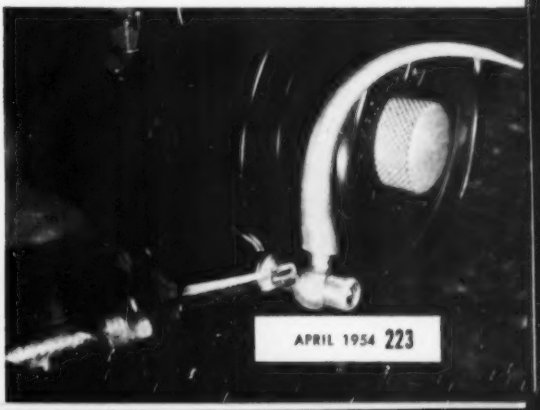
Making Your Spinning Reel as Good as New Is a Lead-Pipe Cinch



SPINNING REEL is easily disassembled by removing screws that hold side cover plate. Grease pinion gear (above), then replace cover and crank reel to distribute grease.

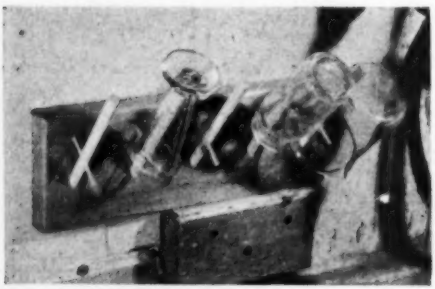
DRAG FELT must be kept dry and free from oil or spool will stick. Check it periodically by removing knurled nut and spool from shaft. Replace felt when it becomes worn or oily.

TINY ROLLER BEARING that carries line on the reel-in must be oiled every time reel is used or it may freeze, causing line to cut grooves in its surface. END



Boat Anchored by Spring Snap

When going fishing, I carry a spring snap in my tackle box. If the boat I rent has an overlong anchor chain and no hook on which to take up the slack, I use the spring snap to shorten the effective length of the chain and keep the boat from drifting back and forth over my lines.—*Thomas P. Ramirez, Fond du Lac, Wis.*

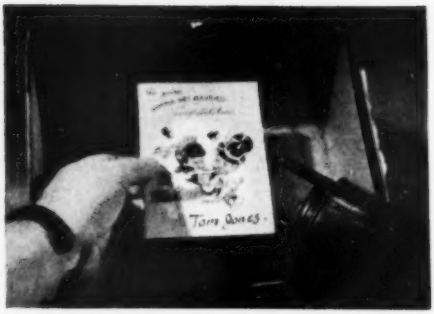


Dowel-Rack Drains Glassware

No blueprints are needed to build this easy-to-make rack on which to hang bottles, jars and other glass containers to drain. The small pegs passing through the bigger dowels not only help anchor the dowels but support the edges of the glassware. The installation shown is in a darkroom.—*Walter E. Burton, Akron, Ohio.*

Sawdust and Cement Make Inlay

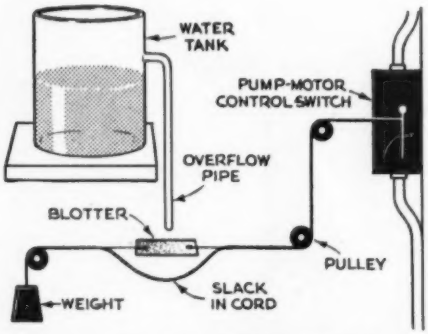
Instead of using bits of wood for small inlay work, try mixing sawdust of a contrasting color with cellulose cement for filling in the inlay grooves. Mix on a piece of glass (wood will absorb the cement) and apply with a putty knife. When dry and sanded smooth, it will look like a perfect inlay.—*Lee C. Stanley, San Diego, Calif.*



Sign Your Name in 3-D Color

For a personal touch on greeting cards, write your name with flock—a velour-like coating of finely cut rayon, wool or cotton fibers that stands out about 1/16" when applied to a tacky surface.

To get the tacky surface, make an adhesive ink by diluting liquid glue with enough liquid food color to make it flow readily from a broad lettering pen. Now write your name on the card with the special ink and apply the flock. A gun, as shown in the photo, is best, but the stuff can be sifted on. Snap the card to remove excess flock and let it dry at least an hour.—*Ken Murray, Colon, Mich.*



Blotter Tears and Stops Water

Here's the system I use to shut off the flow to my water tank on those occasions when I can't wait around for it to fill. Water from the overflow tank soaks the blotter, tearing it apart, and the dropping weight jerks the pump switch.

The weight should be just too light to work the switch when hung on it. To set it for action, tie a piece of blotter in place. Brass reinforcing eyes or staples pressed into the blotter keep the string from pulling out.—*George F. Burnley, Oakland, Calif.*

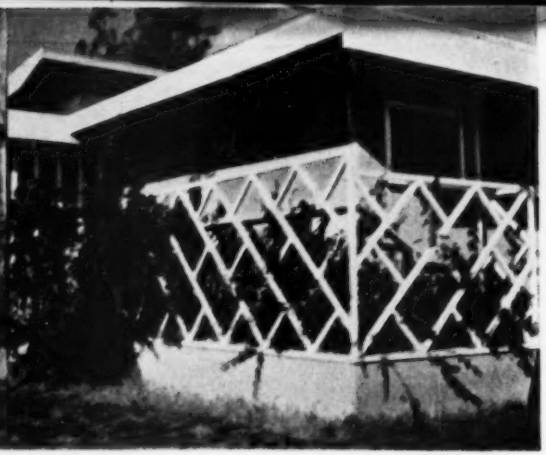
Western Designs Suggest
40 Easy Ways You Can

Improve Your Home and Grounds

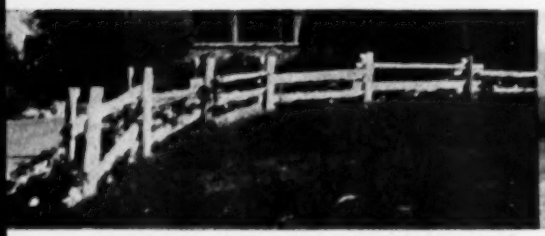
In California, which frequently impresses Eastern visitors as a land of fences and patios, many families live outdoors more than is possible in much of America. And there, craftsmen have vied with each other in designing exterior fittings for modest homes that make lawns and patios as inviting as fine living rooms. In this special report, you'll find 40 pictures of various ways in which Californians have dressed up their homes and grounds. Many of these Western ideas are equally applicable to homes in the other 47 states of the U.S.A.

Back-yard possibilities range from this ultimate to a simple fence screen built in a weekend.

Alternate boards admit breeze but stop vision.

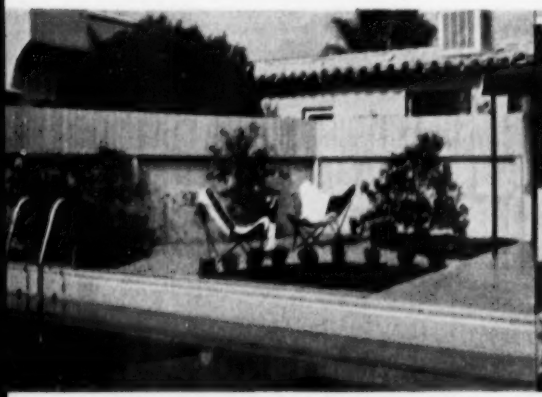


High, planted lattice acts as living screen.



Rough-hewn logs make driveway boundary.

Plain rail job supports flowering shrubbery.

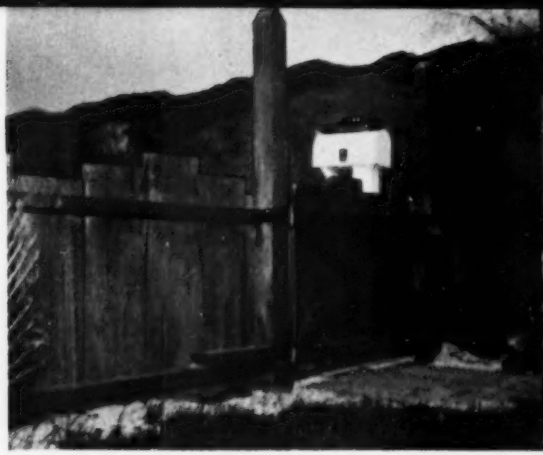


Ledge rail breaks height of tall pool fence.

Flowers top painted boards of odd widths.

The Western Way:

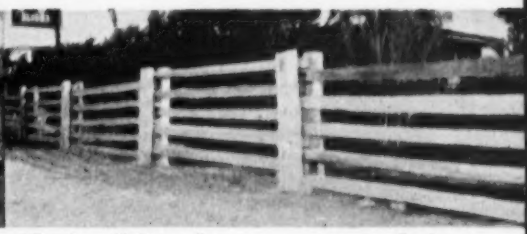
Dramatic Fences Serve Many Purposes



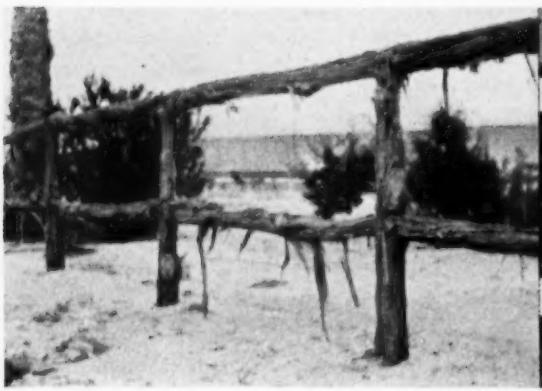
Boards of irregular height avoid monotony.

"Joseph's gate" is stained in various colors.

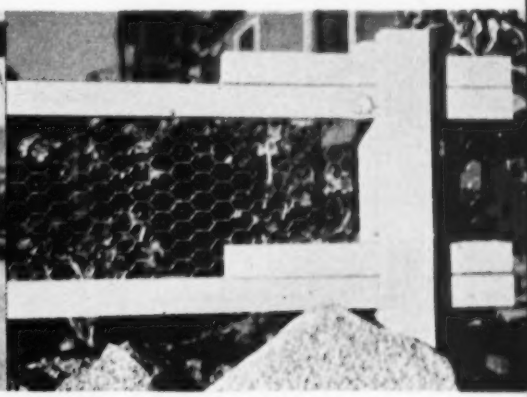
Light palings are nailed to a rail structure.



Classic rail fence has a country-estate look.



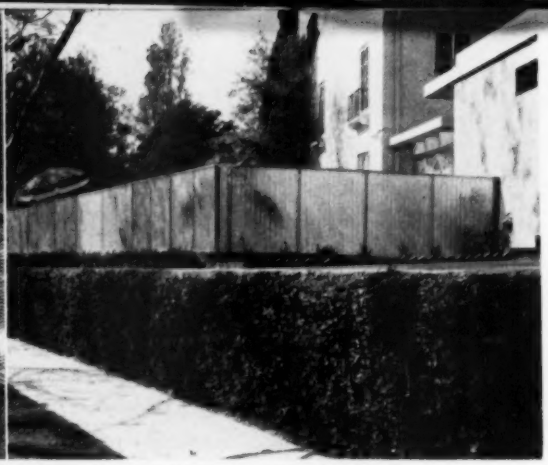
Shaggy cedar fence looks well on sandy land.



Chicken wire between rails helps vines start.

IF FENCES just mean pickets to you, better take a tip from your California cousins. Westerners use new and unconventional material for fences. I've seen some that incorporate plywood, plastic, asbestos—even glass and aluminum.

A fence can do more than just memorialize a property line or keep out stray pooches. It can be designed to create just the right kind and amount of privacy. By screening the sun or intercepting the wind, a fence can regulate the weather. It can serve as an outside version of a partition, establishing separate areas of activity. And while it's doing



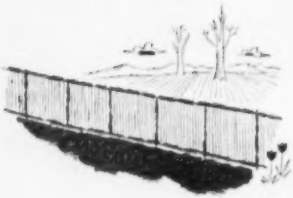
Plastic screening combines with wood strips. Corrugated plastic affords complete privacy.

these things, a fence can often greatly improve the looks of your place.

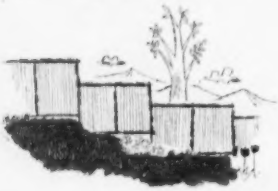
Getting started. Make a drawing, no matter how rough, before you begin work. You can size up possible materials at most fair-sized lumberyards. Even if they don't stock unconventional ingredients like corrugated plastic or asbestos, aluminum or glass, they can usually get them in a hurry.

Some of these materials won't be cheap, but they are easy to work with common tools and require little or no upkeep. Asbestos, plywood and plastic can be cut with a handsaw and put up with nails; aluminum is cut with snips and also nailed up. As for glass, it's generally simplest to order it precut to fit frames that you build.

Posts and rails. If your fence is to be no higher than 4′, 4″-by-4″ posts and 2″-by-4″ rails will do. Posts should be at least 2′ longer than the height of the fence, more in soft soil. Redwood, cypress and



Fences can follow land, or step down.



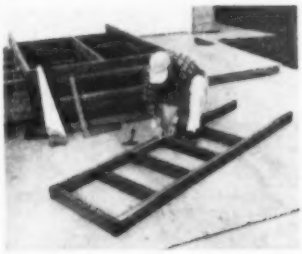
Basket-weave fence of plywood strips.

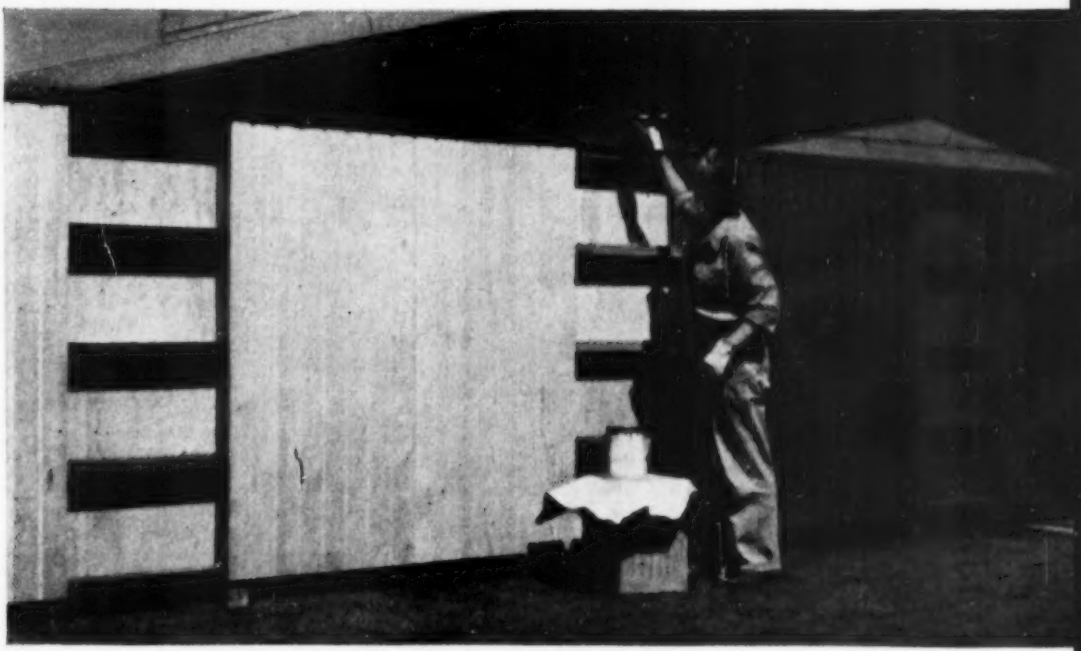
cedar are preferred woods. Resist the temptation to use a handy tree as a post; this rarely works out well.

If you don't enjoy digging holes, see if you can borrow or rent a posthole digger. These outsize augers, which generate holes at a dizzy rate, can sometimes be borrowed from building-supply yards.

Build solid. Since a flimsy fence is an abomination, it's a good idea to set the posts in concrete. Don't underestimate the wind and static loads a fence may have to resist. A single 4′ panel of corrugated asbestos, 42″ wide, weighs some 50 lb., so you need a sturdy frame to hold it. If you zigzag such a fence, the panels will help to hold each other up.

Prefabricating your fence saves labor.

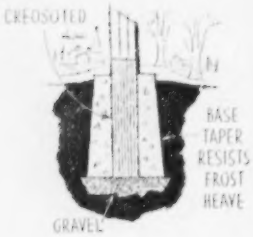


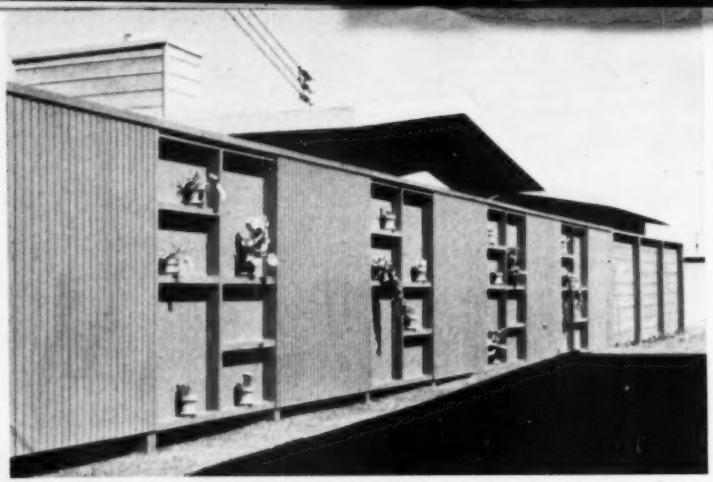


New grooved plywood panels, staggered on two-by-four frame, make an outdoor partition.

If glass tempts you, investigate double-strength window glass, which is about ⅛″ thick and comes in sizes up to about 30″ by 50″. If bought in case lots, the price in my neighborhood is around 40 cents a square foot. A homeowner who wants great unbroken expanses of glass around, say, a sun deck or barbecue, may have to go to ¼″ plate glass. If the price runs too high, look into crystal glass—like plate but less perfect. Glass blocks and wire glass are other possibilities.—*Jerry Parker, Sonoma, Calif.*

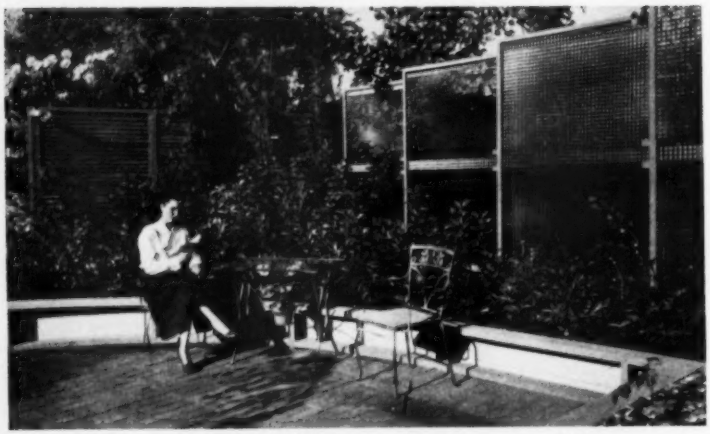
Units fit together on assembly.





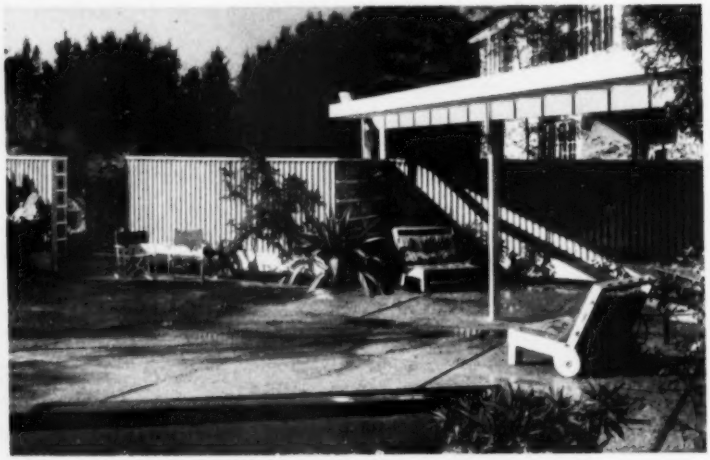
The nooks in this finished plywood fence break up its expanse.

Get it straight—a little built-in waver will annoy your eye for years, even if only you can spot it.



Patterned glass panels give full privacy but do not cut light.

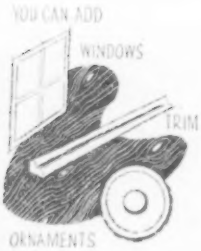
Don't trust your eye, nor a framing square, when establishing right-angle corner. Measure out 3′ and 4′ from provisional corner, and adjust angle until diagonal between these points is precisely 5′.



Corrugated asbestos panels have a colorful, modern appearance.

The Western Way:

Garage Doors Can Be Beautiful, Too



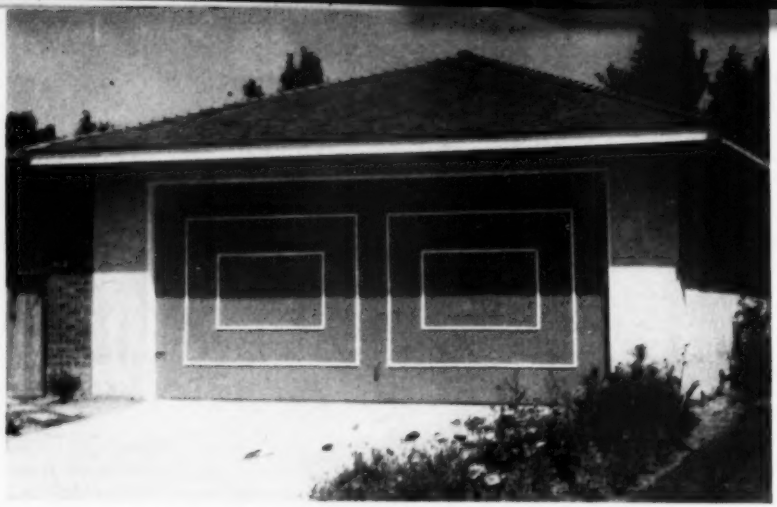
THE overbearing blankness of a garage door does nothing for a house. Nor can you relieve it with shrubs or trellises and still keep your car inside. But out West, homeowners set doors off with trim, windows, louvers or ornaments.

Such features not only ease the eye, but add a one-of-a-kind touch. "Look for the garage with green squares" is a direction visitors will readily remember.

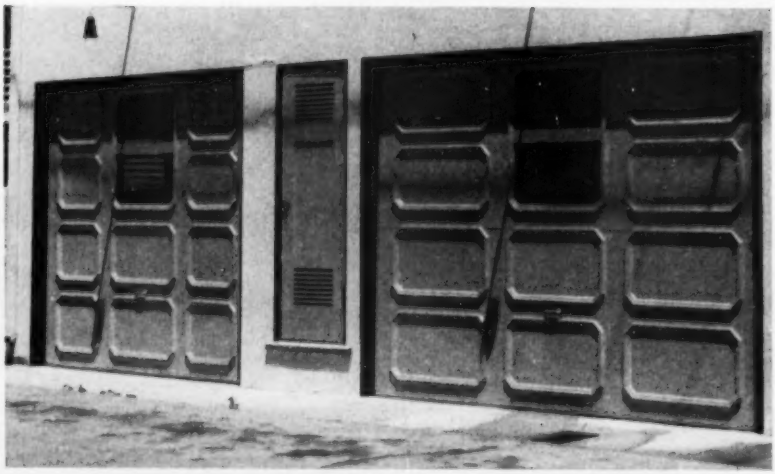
To apply trim to metal doors, you need only drill holes and run wood screws through from inside. Corrugated doors can be disguised by covering them with outdoor plywood. Sheathing grade will do if you fill defects.

Windows and louvers for which the door must be cut through should be spaced to miss load-bearing members such as framing and braces. For more door-decorating ideas, please turn the page.—*Hi Sibley, Nuevo, Calif.*

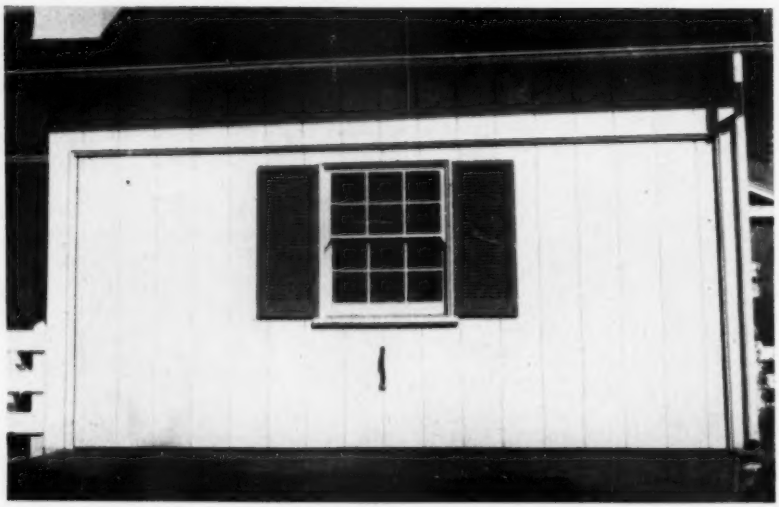
Stock molding frames, mitered at corners, are accented with 8″ lathe-turned rosettes.



HORIZONTAL frames are suitable with a low, overhanging-roofed garage like this. White on a light-blue ground, they are simple but highly effective.



MULTIPLE FRAMES break up these two big doors. Owner used 1¼" stock molding, with eight pieces for each frame. Clearances must be figured to permit the normal operation of an overhead door.



REAL WINDOWS, complete with shutters, relieve plainness of this big door. Hole was cut in the door to receive sash, which was retained by molding all around. The shutters are screwed in place.

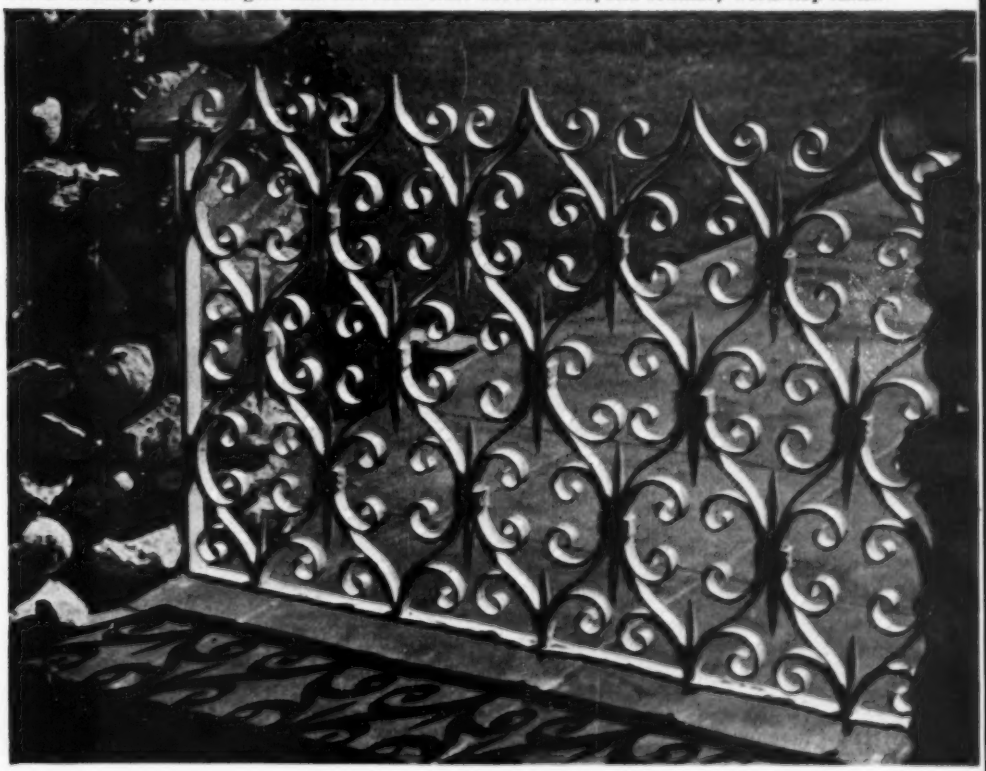
The Western Way:

Iron Gates Blend Beauty and Security

THE airy grace of wrought metal, beloved by the Spanish settlers of California, is still a favorite. Witness these wrought-iron gates, which invite even while they protect. Such gates will blend with wooden, brick or stone walls and fences. They will stand hard use and weather alike.

Design your own. Most designs can be adapted to different proportions by respacing the vertical members. Draw yours on squared paper so that you can scale it up

Blacksmithing your own gate like this takes time but is not beyond ordinary workshop skills.



DOUBLED VERTICAL BARS, bent in a divergent curve, form the diamond shape in this gate.

TALL GATE set between brick pillars makes a restrained use of circles and simple curves.

SCROLL REPEAT has a number of units of four scrolls each. Equally good for gate or door.

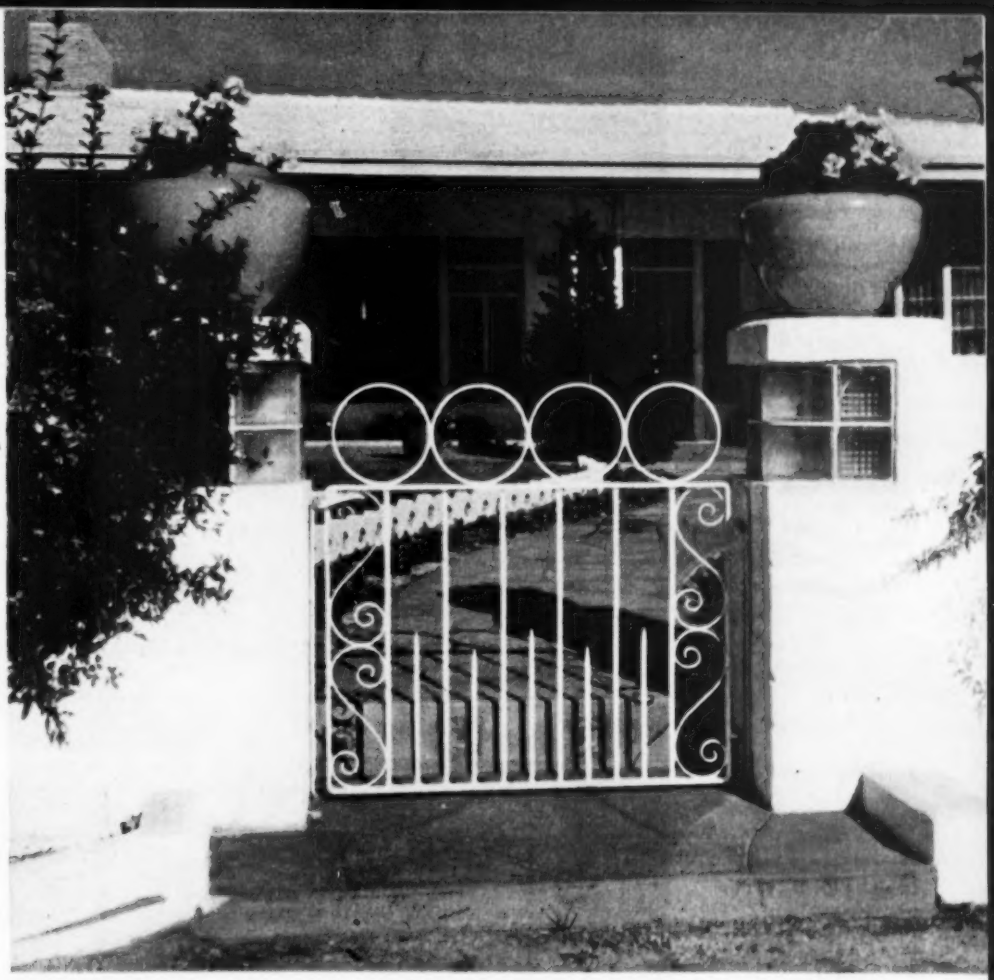
LIGHT BARS INSIDE will serve perfectly well if outer framing of gate is structurally husky.

to actual size as a guide for bending the various parts.

Some welding shops will make up a gate to your drawing. But you can save money by shaping the parts yourself and having them welded, or by welding them yourself if you have the equipment. For welding, parts are simply cut to form butt joints, and there are no holes to drill. But it's also possible to build a gate with bolts, rivets or clips.

Strap iron up to 3/16" thick can be bent cold. The ¼" thickness, which should be used for the outer frame and hinges, must be heated with a torch to make the sharp corner bends.

Aluminum serves, too. Strip aluminum makes an attractive gate that can be painted black or left its natural color. This material is a little easier to work than iron and of course makes a lighter gate. But it is not as easily welded, and you may have to be satisfied with riveted or clip-held joints. A couple of crisscrossed diagonal braces will greatly

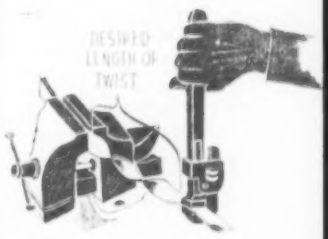


CIRCLES ON TOP add a different touch to this one. Short bars along bottom are intended to discourage stray pups from sifting through the gate. Graceful end scrolls are easy to bend.

strengthen a gate. To prevent electrolytic action, use aluminum bolts or rivets.

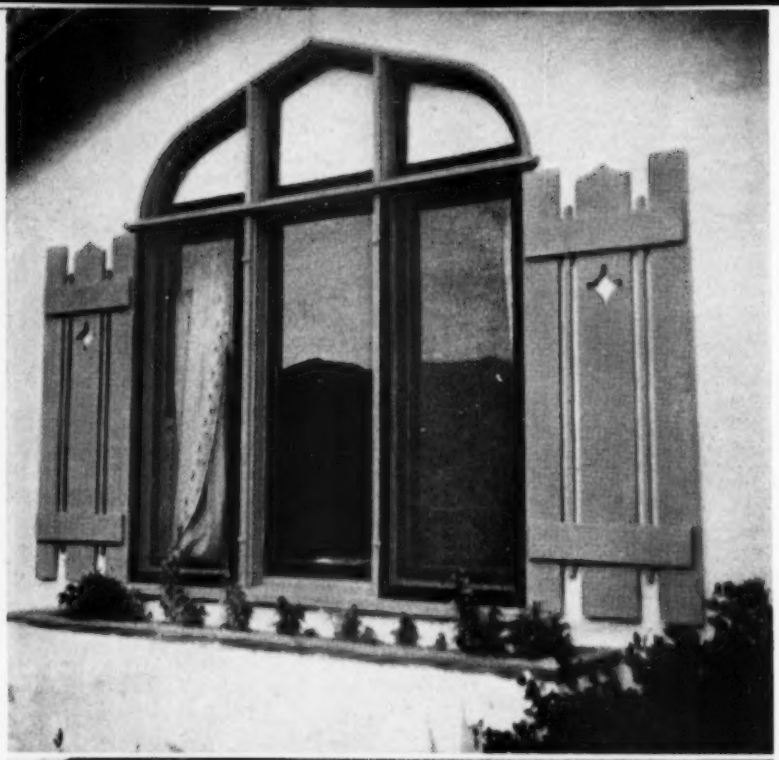
Shaping the metal. A husky metalworking vise is a necessity. Scrolls can be shaped with the help of a jig made of two short pieces of ½" rod driven into tight-fitting holes in a steel block. A piece of heavy-duty pipe with a slot cut at one end is also useful.

Right-angle bends are made by clamping the piece in the vise and hammering the protruding end over. Ends can be left square or finished by flattening with hammer blows. Scroll ends should be finished before bending.

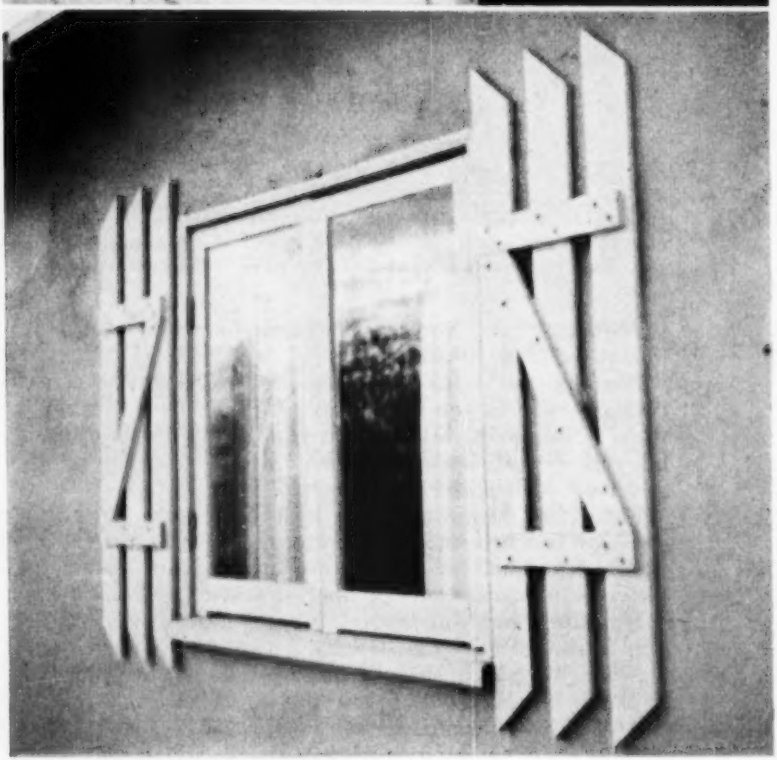


Mounting and finishing. Use lead anchors or expansion shields to hold the stationary parts of the hinges in masonry. Make sure that the line between the two hinges is plumb; if not, the gate will tend to swing one way or the other when unlatched.—*Hi Sibley, Nuevo, Calif.*

UNEQUAL WIDTH of lumber is no drawback; it may even be an advantage, as this pair shows. The central cutout is a simple jigsaw job; with a tool of sufficient capacity, you can stack the stock, cut several at once.



The easiest shutters to make at home are ones with plank-and-cleat construction



SIMPLICITY doesn't spoil the effect if shutters are well suited to the character of the house. In designing your own, it's a good idea to rough together a pair, stick them up temporarily to see how they look.

The Western Way:

Distinctive Shutters Add a Gay Note

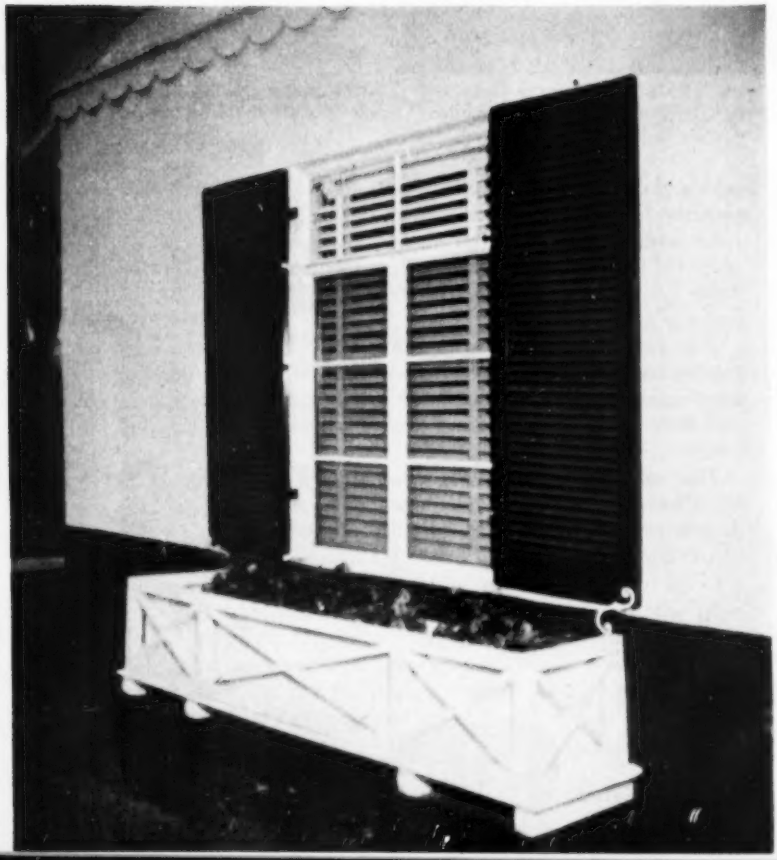
A HOUSE without shutters, many homeowners feel, is not equipped for gracious living.

Shutters, let's face it, will not better your job, improve your digestion or restore falling hair. But as Westerners know, they *will* work some predictable magic:

Shutters make a house go through that same change-for-the-better that you yourself do when you switch from a rust-stained T-shirt to a newly laundered sports shirt.

Shutters literally add to the value of your property. A little money here can mean big money in resale value.

Shutters offer an excellent way to individualize your house

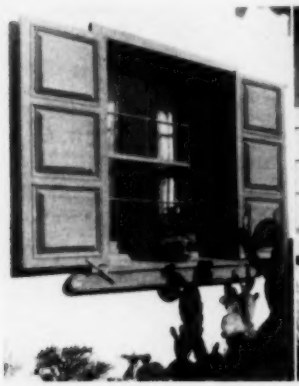


COLOR COMBINATIONS make a lot of difference in the effectiveness of shutters. This pair of louvered jobs was painted a shade to contrast dramatically with the wall and lower course. Flower box is part of design.

WEATHERED SLABS, irregular edges, give fairy-tale look.

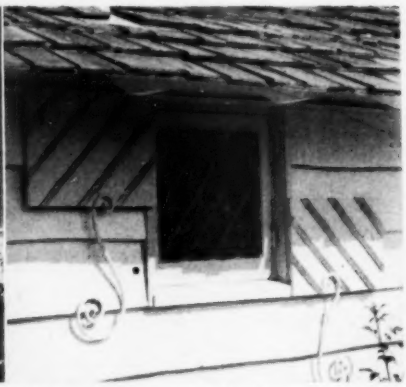
BANDSAWED FRAME trims up these plain planks neatly.

JIGSAWED DECOR, like this, dresses up plywood panels.



RAISED PANEL, with molded edging, gives elegant touch.

POTS contribute a perky little touch to these fine blinds.



DUTCH-DOOR pair can be decorated with molding strips.

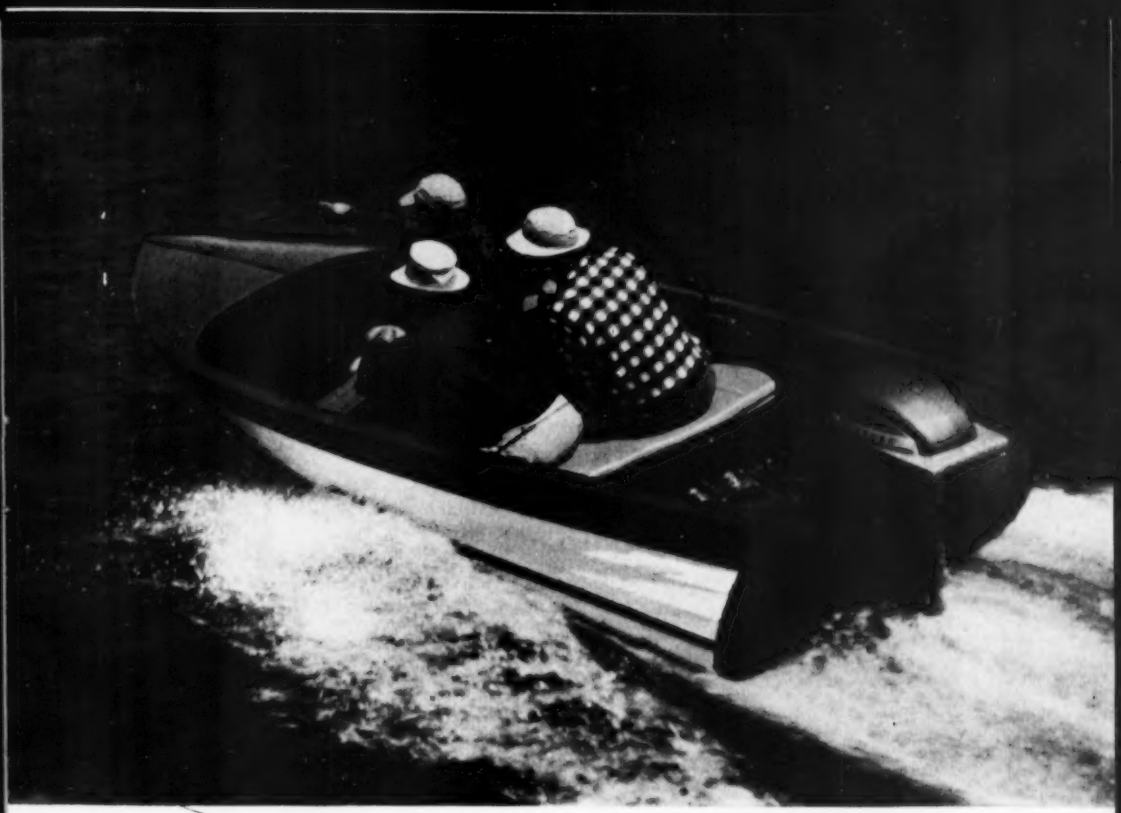
If you make your own, pick a design that is adapted to quantity production in the home shop

—to make it your own and no one else's. This doesn't necessarily mean that if you are a dentist, say, you should jigsaw out of each shutter the silhouette of a freshly extracted three-root molar. But it does mean that there is often some special design or device that will say "Home" to you and the wife and kids.

The easy way. Nothing prevents you from hiring a contractor to install factory-built, working-hinged shutters—except maybe your bank account. New shutters are not cheap, and they can call for a good deal of special hardware and costly hand-fitting.

The easier way. This is to scout building wreckers' yards for a heap of shutters. Pick ones that come within an inch or two of matching the height of your window casings; a closer match isn't visually needed. Lug them home, let your wife go through the strange female rite of selecting just the right color, and spray-paint the lot. Nail or screw them on.

Homemade jobs. If local yards offer slim pickings, it isn't hard to build your own if you use plank-and-cleat construction. Lumber can be fairly rough as long as it is sound. END



look out fish... here we come!

Good fishing's never out of range with this great motor winging you on your course! You can breeze to choice spots 10 or 20 miles away . . . *in twice as many minutes!* And what glorious minutes they are . . . the run is the finest part of the fun! With all its magnificent power and speed, Big Twin is a *fishing* motor. It *trolls*—hour after hour—smooth, steady, quiet! And now Evinrude adds the final convenience—*Finger-Touch Electric Starting!* Now you can operate your boat by *complete* remote control. With electric starting and Simplex controls you start the motor—choke it—shift it—"gun" it—idle it—all without moving from your comfortable seat behind the wheel! You—your wife, your youngsters—*anyone* who can steer a boat can start and run Evinrude's new Electric Starting Big Twin!

SEE YOUR EVINRUDE DEALER FOR A DEMONSTRATION! Look for his name under "Outboard Motors" in the yellow pages of your phone directory. For free, full-color catalog of the complete Evinrude line—the right motor for every boat—write EVINRUDE MOTORS, 4344 North 27th Street, Milwaukee 16, Wisconsin.

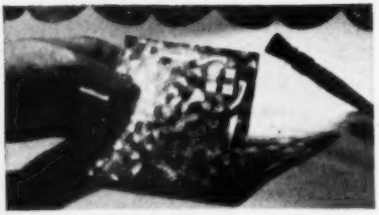
In Canada, Manufactured by Evinrude Motors, Peterborough

Evinrude quiet OUTBOARD MOTORS

CATALOG FREE! Write for big full-color catalog of the complete Evinrude line, 3 to 25 horsepower. Send for it today!

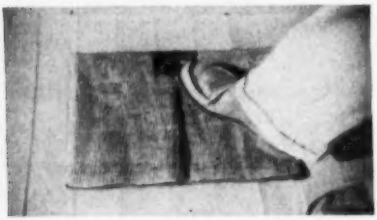
DO IT THE EASY WAY

CLOTHESLINE GET TANGLED? Ask a local movie house for a discarded film reel and wind and store it on this. An 18" reel will take 200 feet of line.



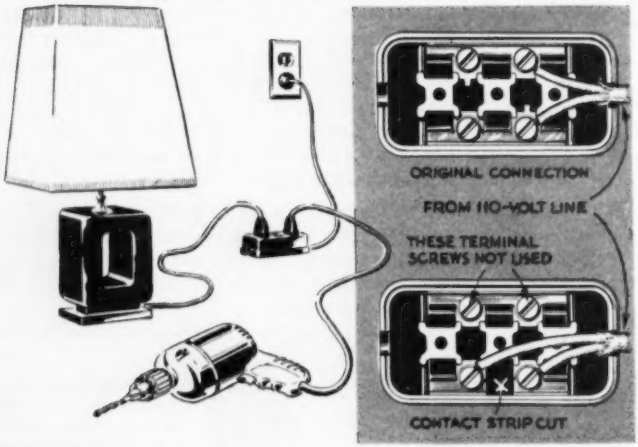
A DURABLE STENCIL for wall or other decoration can be cut from a scrap of reflective aluminum insulation. It wipes free of paint in a jiffy.

A HOLDER for paper bags in the home kitchen is quickly fashioned from a wire coat hanger. Pull it out lengthwise with the hook at the top and then bend up the bottom in a sweeping curve. A spring action will grip the stored bags if the upcurving part is bent back a bit. Hang the holder on the back of a door.



A HOMEMADE MAT at the door will help keep mud out of the house on rainy days. Just stuff 10 or 12 newspaper pages inside an onion or orange bag.

Lamp Wired in Series with Drill Reduces Its Speed



When drilling plastics and other materials, you sometimes need to use a slow drill speed. Regular speed reducers are costly, so I rigged up this homemade resistor to do the job.

The extension outlet, rewired as shown, permits an ordinary lamp to be connected in series with the drill, and the added resistance slows down the drill's speed. — *Frank Victor, NYC.*

How to Power a Hand Mower in One Evening

Once you hitch it to an electric motor, cutting the grass becomes little more work than taking a stroll on your lawn.

By Carroll McGaughey

NEXT best to a lawn that never grows too high is a mower that takes the sweat out of grass cutting. Mine, driven by an electric motor that I put on it myself, did so all last season and is ready for another.

This conversion was so simple that I let myself be talked into doing it on sev-

THE JOB IS EASY because you do not have to cut the reel blades short to make room for a pulley. Instead, the pulley goes outside the side frame like this. The mower wheel (here removed) is held out by a spacer on the axle just far enough to clear the pulley. A motor mount is made of two pieces of wood and clamped to the front tie bar. A large turnbuckle provides belt tension.

REMOVE EACH WHEEL and pull the small pinion gear off the end of the reel shaft. Then push the pawl (arrow) out of its slot in the shaft. Having decided which side of the mower the motor will go on, replace the opposite wheel, leaving out pawl and pinion.

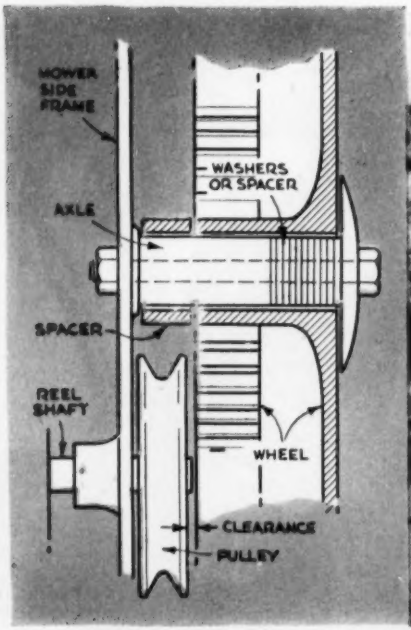
eral neighbors' mowers. These run fine, too.

Apart from the motor, materials cost only three or four dollars. No major change is made in the mower—you remove only the pinions and pawls that drive the cutting reel. The motor will do that. You still have to push the mower, but this is easy when the wheels are not spinning the reel. Should you ever want to go back to muscle mowing (wanna bet?) or trade the machine in, you can reconvert it in half an hour.

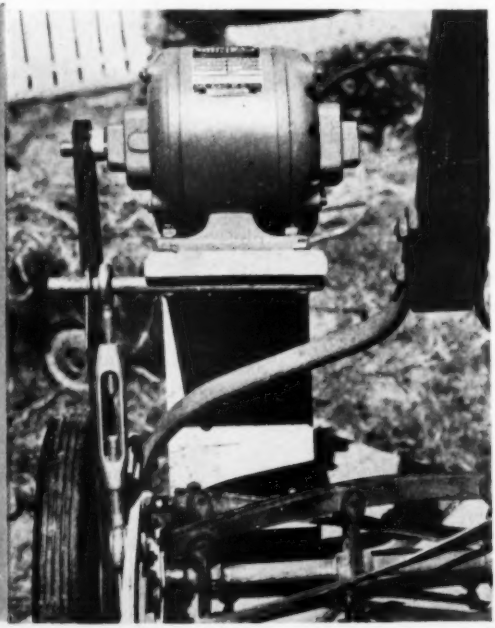
Although I find a ¾-hp. motor adequate even for heavy grass, a ½-hp. unit will give a desirable reserve of power. Also, because friction between reel and cutter bar creates a high starting load, it is a good idea to use a capacitor-start motor.

To go electric, first remove the axle bolts and take off both wheels. Then pull off the pinions and push the pawls out of their slots in the reel shaft.

Look at your motor to see which way it turns from the drive-pulley end. Then decide on which side of the mower it should be mounted to spin the reel forward. The rig shown has the motor on the left, but if



A HUBLESS PULLEY goes on the reel shaft and a spacer is put on the wheel axle to hold the wheel out of contact with it. About 1" of the axle should still enter the wheel bearing. Put washers or a second spacer on the axle bolt to keep it from clamping the wheel.



AT THE REAR the motor mount is supported by a husky turnbuckle, which can also tilt it up or down to adjust belt tension. A washer and cotter pin retain the turnbuckle on a rod bolted to the rear of the mount. The lower eye is bolted to the mower side frame.

yours runs the other way, you may find it easier to turn it around and mount it on the right than to reverse it electrically. Now replace the wheel on the other side, leaving out the pawl and pinion.

At the end of the reel shaft on the motor side, mount a 2½" hubless pulley. It is a good idea to drill a dimple or file a flat in the shaft as a seat for the setscrew.

Wheel Axle Is Extended

The mower wheel will now hit the pulley, but it should still bear on the axle for about an inch. This is enough to carry the weight of the machine. The wheel must be held out of contact with the pulley while as close to it as possible. For this you will need a longer axle bolt and a spacer. Use a bronze bushing that will just slip on the axle, or file out a piece of pipe or a fitting to a push-fit on it. Cut it a bit long and file to correct length by repeated trials.

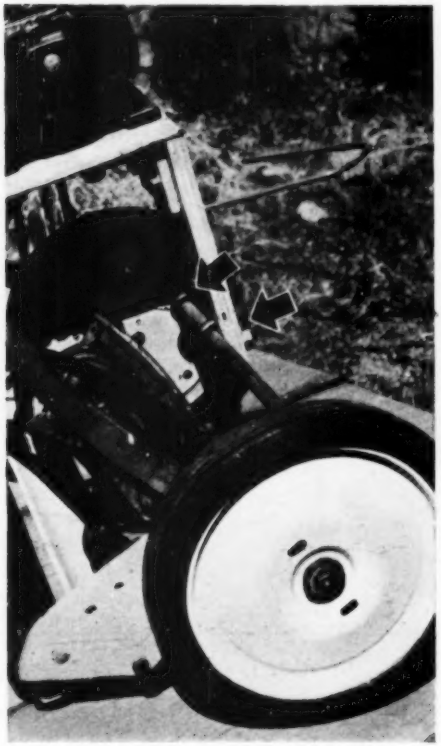
If the axle bolt were now pulled up tightly, it would pinch the wheel and keep it from turning. To prevent this, put a second spacer or a number of washers between the end of the axle and the head of the bolt. This spacer can be a loose fit in the wheel bearing. It should be just long enough to let the wheel turn freely.

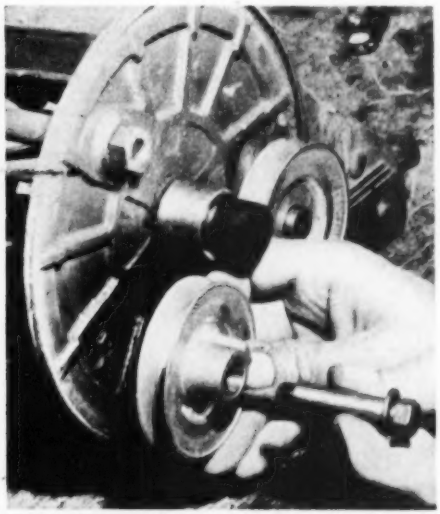
For good balance, the motor shaft should be almost directly above the reel pulley. Do not set it forward of the wheel axis or the rig will tend to tip forward. Make the motor mount of two pieces of ¾" exterior plywood, bolted together at right angles with a piece of heavy angle iron. Attach it to the front tie bar with two U-shaped cable clamps.

Under the free end of the motor shelf, bolt a short ½" steel rod extending beyond it on the pulley side. Slip one eye of a big turnbuckle on the rod. Bolt the bottom eye to the side plate of the mower, drilling the bolt hole in any convenient spot.

A 1½" motor pulley turning at 1,750 r.p.m. will run the reel at a suitable speed. Measure around both pulleys to determine belt length (probably between 33" and 40").

Run the motor cord up the handle to a switch. Attach enough heavy-duty, rubber-covered cord to reach all your lawn. END





ONE MOWER (above) had a handle yoke so shaped that the motor had to be far forward, putting the axle in the path of the belt. An idler pulley was added to run the belt in a triangular path around the axle. It turns on a bronze bushing clamped to the side plate with a long bolt. A washer keeps the pulley on.

U-SHAPED CABLE CLAMPS (arrows, left) hold the motor mount on the front tie bar but let it pivot when the turnbuckle is adjusted.

Mesh Box Bottom Drains Water

LET loose in a sandbox, young diggers often try to reach China, mixing a lot of dirt with the clean play sand. But if you put a solid bottom on the box, rain water won't drain away, while a perforated sheet is likely to rot or rust. A simple solution is to tack a sheet of ½″ or ¼″ mesh screening across the bottom—it lets the water out but keeps the digger out of the dirt.—*E. Gaynor, Wantagh, N. Y.*

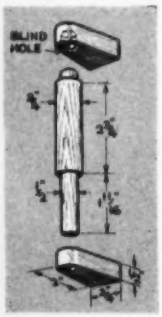
Snack Bar Serves Junior Miss

A LUNCH COUNTER built to small-fry size right in the kitchen not only delights the children but enables mother to feed them while going about other kitchen chores.

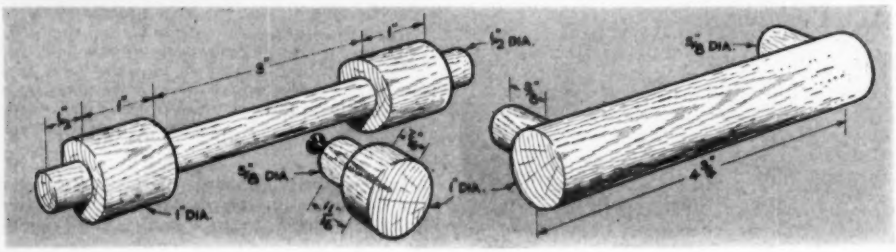
This one was made from a one-by-twelve 28″ long, with the corners rounded and the whole board sanded. It is hinged to the door about 18″ from the floor, and is supported by a 1″ dowel leg that fits into a hole drilled in the underside of the board.

The bar folds up against the door, and is held by a loop of cord hooked over the doorknob. Slip the leg between shelf and door.—*Louis Alexander, Bellaire, Tex.*

Use Scraps of Doweling to Make Unusual Door Handles



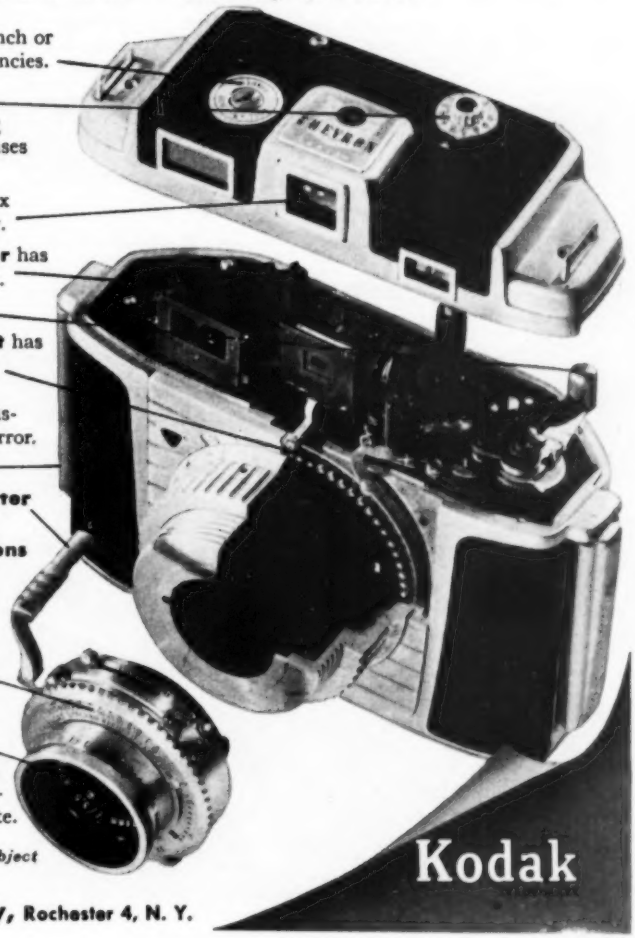
ALL sorts of simple and attractive door and cabinet handles can be made from scrap lengths of dowels. The one at left, an unusual design suitable for vertical mounting, consists of a large dowel bored out to receive a smaller one. The two brackets are rounded to a matching radius and the handle installed with the "tail" down. Below are several other types made by combining various sizes of dowels. Screw the handles on from the inside of the door to conceal the screwheads.—*Walter E. Burton, Akron, Ohio.*



Here's the wonderful new Kodak CHEVRON Camera

Now, for the first time, Kodak's finest lens and fastest shutter in a precision 2¼x2¼ rangefinder camera

People kept asking: why doesn't Kodak combine the famous Ektar Lens, the Kodak Synchro-Rapid 800 Shutter, *plus* a coupled rangefinder, in a precision 2¼x2¼ roll-film camera? The Kodak Chevron Camera is it—a big camera, rugged, solidly balanced, designed for unsurpassed picture quality, trouble-free operation! And all at a sensible price—$215. See its many features in cutaway view below.



Viewfinder adjusts for 2¼x2¼-inch or 28x40mm. negatives and transparencies.

Automatic exposure counter.

Uses Kodak 620 Films, including Ektachrome and Kodacolor; also uses 828 film with adapter (extra).

Viewfinder has automatic parallax correction from 3½ feet to infinity.

Precision, split-field rangefinder has Vee bearings for focusing accuracy.

Handy thumb-lever film wind.

Tubular lens-and-shutter mount has ball-bearing action. Focusing ring rides on 56 ball bearings under constant pressure, for smooth focusing, with no "play" to introduce error.

Die-cast, all-metal body.

Convenient smooth-action shutter release.

World's fastest between-the-lens shutter—Kodak Synchro-Rapid 800. Ten speeds: 1 second to 1/800, plus "B". For flash, continuous time-delay from 2 to 22 milliseconds; X-F-M synchronization settings.

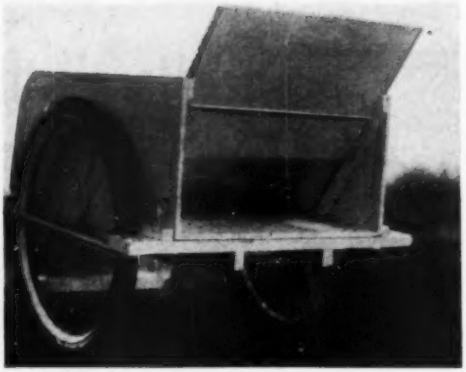
Kodak's finest lens—the Ektar 78mm. *f*/3.5—gives you needle-sharp negatives or transparencies for exceptional prints and enlargements—in color or black-and-white.

Price includes Federal Tax and is subject to change without notice

Eastman Kodak Company, Rochester 4, N. Y.

Kodak

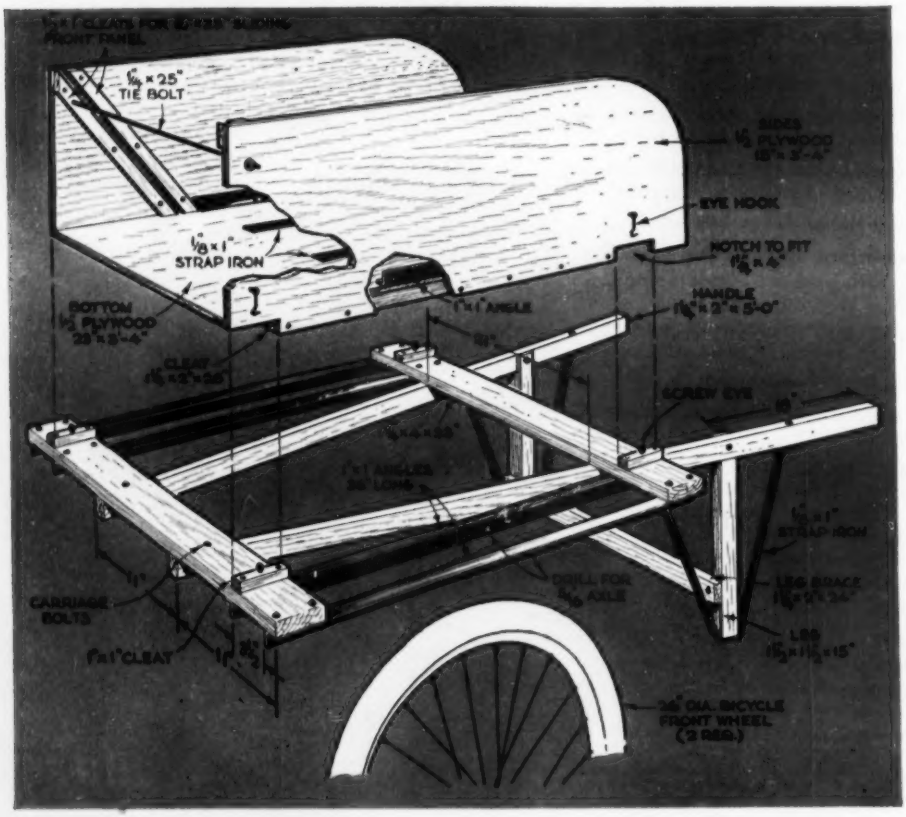
Convertible Wheelbarrow Eases Garden Chores



BICYCLE wheels make this wheelbarrow easy to roll over a lawn, even with loads up to 300 lb. The front panel slides up for dumping loose material. The body unhooks so the frame can be used alone for carrying pipe or lumber.

Angle iron adds strength to 1¾" lumber to make a rigid, lightweight frame. The wheels turn on standard bike axles bolted between the two angles on each side of frame. At rest, two wood legs braced by 1" strap iron support the outfit.

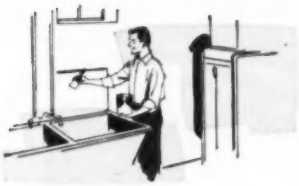
Three sides and a bottom of ½" plywood are joined by 1¾"-by-2" cleats and reinforced on the inside corners with angle iron. Iron strips strengthen and protect the floor. Two ½"-by-1" cleats on each side hold the front panel in place and serve as guides for sliding it up for dumping. Sides are notched to fit over the cross members of the frame. Eye hooks on each corner lock into screw eyes on the frame to hold the body in place.—*W. M. Basch, Rumson, N. J.*



Bright Ideas for Your SPRINGTIME SPRUCE-UP

"Liquid Aluminum"

Brushes or Sprays on Like Ordinary Paint . . . Gives Bright Protection to Your Home, Equipment, Do-It-Yourself Projects



Bring sunshine into your basement. Let *Liquid Aluminum* beautify gloomy walls, protect piping, ducts, furnace, wash tubs and other fixtures.

Touch up your valuable equipment . . . children's toys. Seal them against rust, moisture . . . with just one coat of wonderful *Liquid Aluminum*.

Finishing touch to your handicraft . . . a painted-on coating of *aluminum* beauty that makes things last years longer.

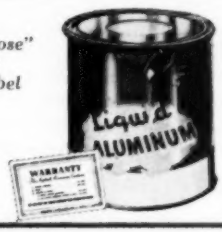
Guard your rustable chain-link fences, railings, incinerators, etc., with this gleaming *metal* coating that resists moisture, sun, heat.

If you like to do-it-yourself . . . you can do it *better* with the help of *Liquid Aluminum*. You'll find 1001 uses for this amazing *metallic aluminum coating* that goes on just like ordinary paint. Made by leading paint manufacturers. Keep a can of *Liquid Aluminum* always on hand.

Amazing Leafing Action

Protective beauty that *lasts years longer* is due to this unique "leafing action." Tiny flakes of aluminum rise to the surface as *Liquid Aluminum* dries to form a firm, tight coating of pure aluminum.

For "All-Purpose" Type, look for shining foil label at left.

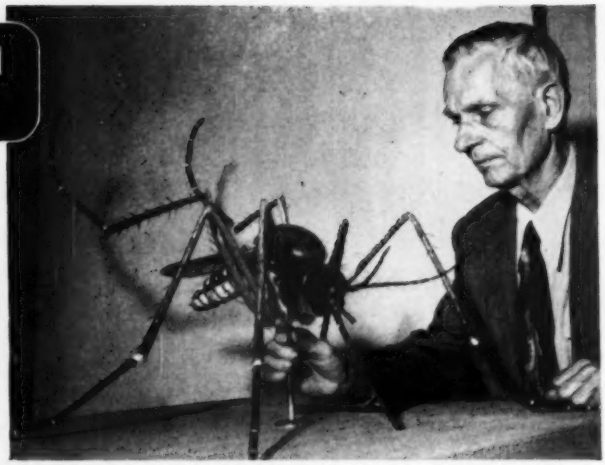


***FOR ROOFS,** use heat-reflecting Liquid Aluminum with asphalt. Look for the special Warranty Seal that guarantees the right amount of aluminum in an approved vehicle.*

This advertisement appears in the interest of the Paint Industry of America

REYNOLDS METALS COMPANY • 2500 SOUTH THIRD STREET • LOUISVILLE 1, KENTUCKY

CRAFTSMEN AT WORK



Big Buzzer. The 30-inch mosquito at right is probably the biggest in the world—enlarged 64 diameters over those you swatted last summer. Fortunately it exists only in plastic, steel, nickel and nylon. The huge model, made at home by Chris Olsen of West Nyack, N.Y., has more than 20,000 scales and spines. It is now in a Boston museum.

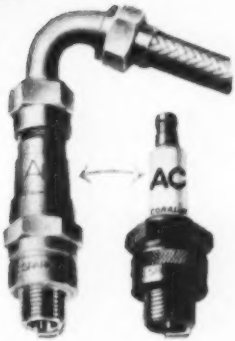
Auto Spring Powers Bow. The William Tell above is making the most of modern technology—his crossbow gets its zoom from the leaves of an auto spring. Eduard Breland of Laurel, Miss., built the bow. Since he was not using a tapered spring, Breland had the leaves ground down in order to get the bow to flex. The fittings are steel.

Homemade Telescope Tracks Stars. Just like Palomar's Big Eye, the private eye below follows a star all night across the sky. Constant drive speed is obtained from a two-r.p.m. synchronous motor working through a tiny double universal gear, made of two fiber disks joined by a union. Using his home-workshop lathe, Dr. E.R.V. Anderson of Los Angeles turned the setting circles from tricycle wheels; the bearing tubes from double-thickness pipe.

Junior Hot Rod Is Combo Job. This streamlined roadster was built from two scooters, a brace of 1940 Buick rear fenders and a German, two-cycle bicycle engine. The 4½-hp. engine provides a top speed of 18 m.p.h., but a governor holds junior drivers down to four. The car is equipped with clutch, brake pedals and foot accelerator. Sgt. John C. Stahlnecker, whose home is in DuBois, Pa., built the car for his son Eddie, shown above getting a ticket from an M.P. corporal. It cost the sergeant about $110, including professionally machined parts, and a week's spare-time work. He built it while stationed overseas.

Sea-Going Truck and Pontiac Star Chief

ACs with Patented *CORALOX* Insulator are Built for Both!



Waterproof Plug Automotive Plug

The waterproof spark plug developed by AC for the Ordnance Corps is as important to the performance of an amphibious military truck as the Snorkel tube which enables the engine to "breathe" under water. The insulator of these plugs is the same material as the insulator of AC plugs used in cars.

Both insulators are formed of patented *CORALOX*, the greatest spark plug development in 40 years. *CORALOX* is chemically resistant to the oxide deposits that result from the burning of leaded fuels. Being exceedingly strong, it permits the use of longer, thinner insulator tips which heat up rapidly to burn away oil and wet carbon deposits—the major causes of engine misfiring. That's why many car owners get—

- **A POWER INCREASE RANGING UP TO 10%**
- **FUEL SAVINGS OF AS MUCH AS ONE GALLON IN TEN**

when they change to new ACs with patented *CORALOX*.

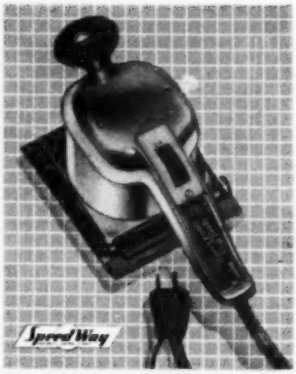
ORIGINAL EQUIPMENT ON NEARLY AS MANY NEW CARS AS ALL OTHER MAKES COMBINED

AC SPARK PLUGS

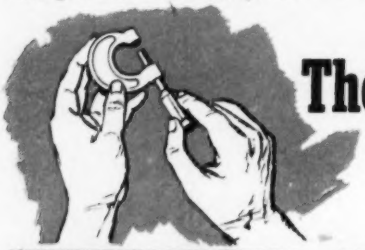
AC SPARK PLUG DIVISION
GENERAL MOTORS CORPORATION

Everything for sanding, polishing. Flexan electric drill accessory kit includes: 4⅞" flexible rubber disc, precision molded with metal insert; two 5" aluminum oxide abrasive discs; 5½" lambswool polishing bonnet; ¼" shank for fitting to drill. (2HR2084) **$1.35**

Flick of the thumb makes this Wizard adjustable end wrench fit a wide range of nut, bolt sizes. Narrow tempered alloy - steel jaws. Deep-throat design. Twice as strong, yet 1/3 lighter! Chrome-plated head. 4" to 15" sizes. 8" illus. (HR2402) **$2.19**

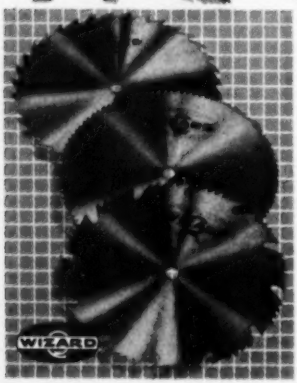


Ends tiresome hand sanding. Speedway Speedsander sands and polishes to "piano finish". 4½" x5" platen floats on 4 Neoprene balls . . . describes 3/16" orbit 3,450 times a minute. Ball-bearing motor, direct drive. Cast aluminum body. (2HW1148) **$34.50**

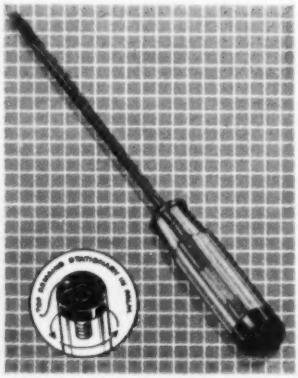


The Pick of America's Finest

Save time, save work . . . do it



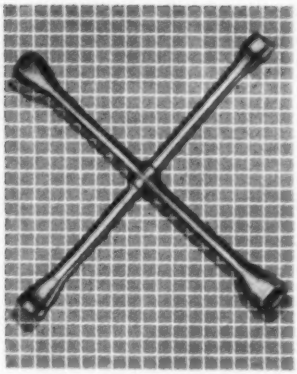
Wizard bench saw blades, famous Cocker quality (96 yrs. experience). High carbon, chrome-nickel alloy steel. Highly polished, won't bind. ½" or ⅝" hole.
8" Combination (2HR1022) **$2.49**
8" Rip blade (2HR1023) **$2.49**
8" Crosscut blade (2HR1024) **$2.49**



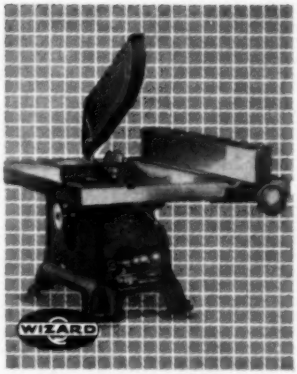
"Swivel-top" designed handle of fluted, firm - gripping Tenite makes this screwdriver practically blister - proof. Precision ground polished steel blade. Straight shank for deep countersunk screws. Cross-ground tip holds snug. Shockproof (HR1302) **.55c**

Built for heavy duty. Big 21" Wizard tool box provides safe, convenient storage, easy carrying for dozens of tools. 24-gauge steel. Spot - welded joints. Hip-roof style with removable tote tray, tapered partitions. Double handles. (4HR4864) **$5.35**

Choose from over 1,100 professional quality power and



Change tires in a jiffy! Spinning action of 4-way rim wrench makes wheel nut removal quick, easy. 14" cross bars of forged carbon steel. Rust-resistant. Four deep sockets, size: 5/8", 3/4", 13/16", 7/8". Fits all passenger car wheel nuts. (4HR3755) ..... **.89c**



Makes woodworking easy. Wizard 8" bench saw rips, cross-cuts to 2¾" depth. 17¼"x14" cast iron table tilts 45° for bevel cuts. Heavy oilite bronze bearings. Dado capacity: 11/16" wide, 1¾" deep. Rip fence, miter gauge, comb. blade, guard. (2H1008) **$37.75**

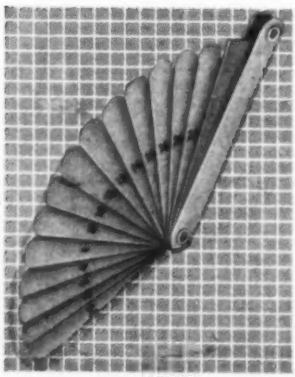
Perfect power for tool grinders, power hacksaws, sprayers, etc. ¼ HP Westinghouse motor has long-life windings, sleeve bearings, nylon thrust washers, drip-proof brackets. 1725 rpm, 115 v, 60 cyc. AC. Split-phase. 1 yr. warranty. (2H1600) **$17.25**

"Do it Yourself" Tools... at Western Auto

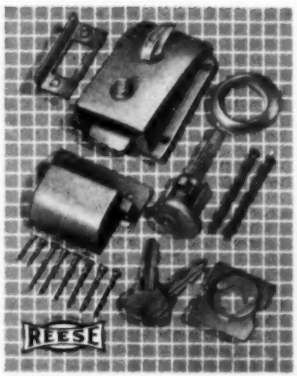
STORES AND ASSOCIATE STORES

easier, faster, better... and save

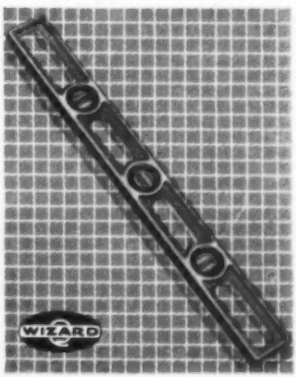
NOTE: Western Auto Associate Dealers own their stores and set their own prices, terms and conditions. Prices may vary due to differences in local conditions. If you do not know the location of your nearest Western Auto Store write Western Auto Supply Co., 2107 Grand, Kansas City, Missouri. (PS44)



For top engine performance, make precision adjustments of pistons, spark plugs, tappets, etc. with this Westcraft thickness gauge. 15 blades (.002 to .025) of tempered steel. Polished to close tolerances. (4HR3189) ..... **.54c**
Others from ..... **.22c** to **.94c**



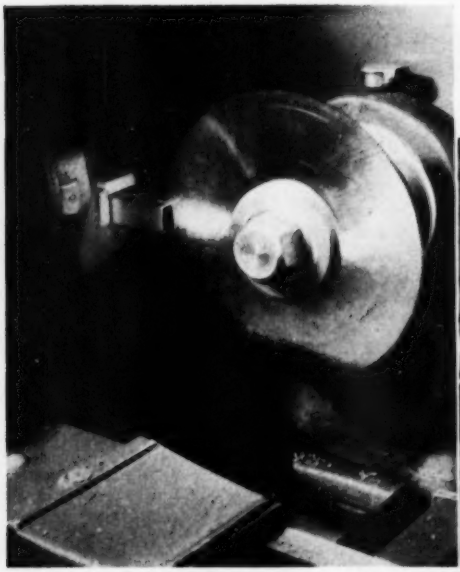
Enjoy the extra protection of a Reese night latch. 5-pin tumbler mechanism with two strikes, reversible bolt. Mounts on either side of any door 1⅛" to 3" thick. Die-cast body with brass latch-lever permits one-hand operation. 2 keys. (3H59920) **$2.95**



Lasting accuracy guaranteed. 24" Wizard lightweight aluminum level has patented setting compound in heavy protective lenses. Heat treated warp-proof casting with milled surfaces... can use in any position. Six-glass (4 plumbs, 2 levels). (4HR6379) **$5.19**

hand tools... see your Western Auto man this week.

NEW Shop Ideas

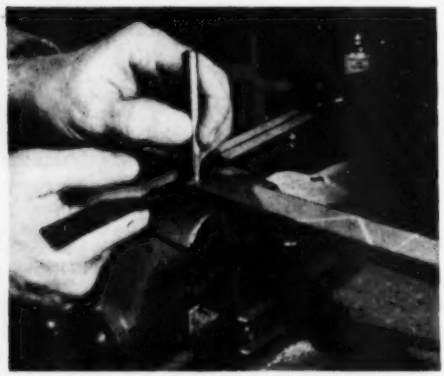


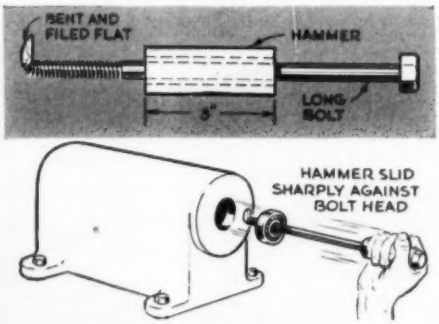
Chuck Arbor Holds Milling Cutters. Need a true-running arbor for a slitting saw or milling cutter? You can turn one from an inexpensive chuck-arbor blank obtainable at most tool shops. The blank comes with an accurately ground taper shank in sizes to fit most lathes.

Seat the blank firmly in the lathe and turn a shaft on the end to fit the cutters. Leave a shoulder on the arbor to bear against the clamping washers. Thread the shaft in the lathe and face the bearing surfaces of the lock nut and both washers on the arbor to eliminate wobble.

Punch witness marks on the lathe spindle, arbor and washers so that they can be used in the position in which they were made. *—Joseph Tracy, NYC.*

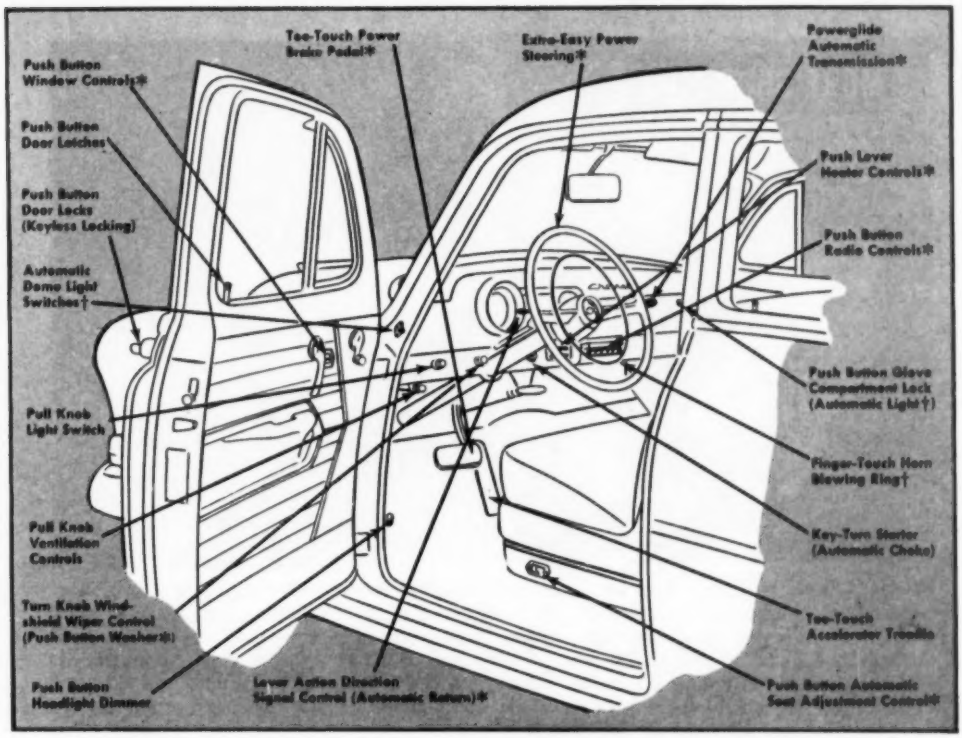
Silver Pencil Lays Out Welding. Use an art-store silver-lead pencil to mark steel plate and angle for cutting and welding. The silver lines are brighter and easier to see than ordinary pencil or scribed lines, and remain legible near welds as reference points for further assembly or machining.—*Howard McEntee, Ridgewood, N. J.*





Hooked Tool Pulls Bearings. Bearings or bushings that cannot be driven out from behind can be yanked out with this impact tool made from a long bolt. Make the hammer from a short piece of steel rod drilled to slide easily on the bolt. Slip it on the bolt, bend the bolt end over and trim the bend short with a hacksaw. File a flat on the bend to grip the bearings.—*L. Stadelbauer, Detroit, Mich.*

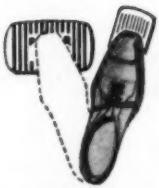
 Please turn to page 254 for more shop ideas.



Advanced Chevrolet Engineering brings

THE CYBERNETIC CHEVROLET

(Cybernetic = Automatic Control)



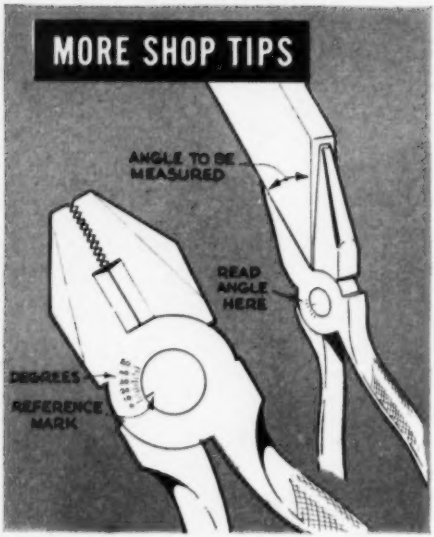
Just a Swing of the Toe from "Go" to "Stop"

Cybernetics (sigh-bur-net'-ics)—the marvelous new science of automatic machines—lends its name well to the Cybernetic Chevrolet. Through more extensive use of automatic devices, Chevrolet now makes driving as automatic as you may wish it to be. Prompted by you through the simplest of motions—a touch of a finger or toe, an easy movement of your hand—these devices immediately and automatically respond to your will. With a touch on a button, an electric motor automatically moves the front seat to your most comfortable position. Front windows, too, adjust automatically to your command. While you're driving, the Powerglide transmission automatically selects the proper power ratio. At the go signal, its "automatic low" swiftly carries you ahead of traffic. Power Steering and Power Brakes automatically take the work out of parking and stopping. All these automatic advances now are yours, as extra-cost options, in the Cybernetic Chevrolet. See your Chevrolet dealer and try it. Find how much simpler, easier, and more enjoyable driving can be. . . . Chevrolet Division of General Motors, Detroit 2, Mich.

*Optional at extra cost. Power Brakes available on Powerglide models; automatic front window and seat controls on Bel Air and "Two-Ten" models. Windshield washer, direction signals, heater, and radio are accessories.
†Standard in Bel Air and "Two-Ten" models.

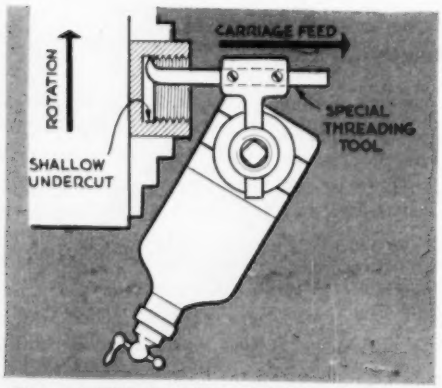
EVER FINER ENGINEERING — CHEVROLET — EVER FINER CHEVROLETS

COPYRIGHT 1954
CHEVROLET MOTOR DIVISION OF
GENERAL MOTORS CORPORATION

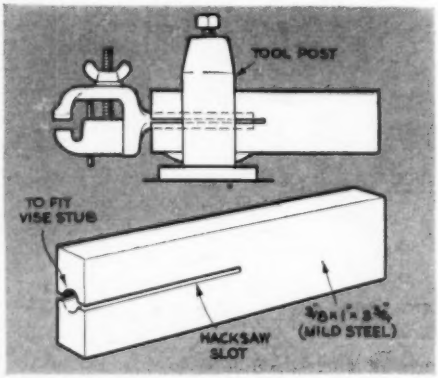


Pliers Check Angles. You can quickly rough-check angles with a pair of pliers graduated in degrees. Cut degree marks on the hub and an index line on one jaw with a thin punch or vibrating engraving tool. To use, grip the work between the jaws so that the jaws line up with the angle of the work.—*Pvt. P. E. McCafferty, Fort Bliss, Tex.*

Angles Guide Letterpunches. Two short pieces of steel angle riveted back to back will support letter and number punches vertically for making even indentations. The joint between the angles can be used as a guide line for spacing out the letters against a machinist's rule or for setting them evenly along the edge of a workpiece.



Thread Blind Holes Safely. Avoid jamming a tool bit into the bottom of a blind hole by cutting threads with the lathe in reverse. Grind a threading tool to work *behind* the lathe centerline and set the carriage to feed from left to right. Advance the tool into the bore with the manual feed, then engage the half-nut lever according to the marks on the lead-screw dial as when threading from right to left.



Hand Vise Used in Lathe. Grip jointer blades, lathe tool bits or small workpieces in this vise to pass them accurately over a grinding wheel mounted in the lathe headstock. The vise, a small hand vise with the handle removed, is clamped in a steel block cut to fit the tool post. The stub is inserted in a slotted hole in the block, and pressure of the tool-post bolt locks it at any desired angle.—*F. H. Louden, Sarasota, Fla.*

Her kitchen will always look NEW

She works here...

you can make it easier for her!

Her kitchen is really her workshop. She takes pride in it, too—*when it's easy to clean up* after food preparation or dishwashing.

You can easily give her modern work-surfaces that clean with a damp cloth. St. Regis Panelyte doesn't stain, scratch or grow shabby. Refreshing in color and design.

Ideal for bathroom walls, vanity tops, too.

Simple hand tools are all you need to install St. Regis Panelyte yourself. And you make worthwhile savings. Ask your building materials or floor coverings dealer for the large 4' x 10' sheets in one-tenth-inch thickness.

Ask also for the free "Do-It-Yourself" practical instruction booklet. *Or get the coupon off today.*

ST. REGIS
PANELYTE
THE MODERN SURFACE

She can have her choice of many accepted designs, each in several colors.

St. Regis Panelyte is manufactured by St. Regis Paper Company, one of America's largest paper manufacturers, with resources ranging from raw materials in its own forest preserves to modern mills and plants and its own world-wide distribution.

Send for FREE "Do-It-Yourself" Booklet

PS-454

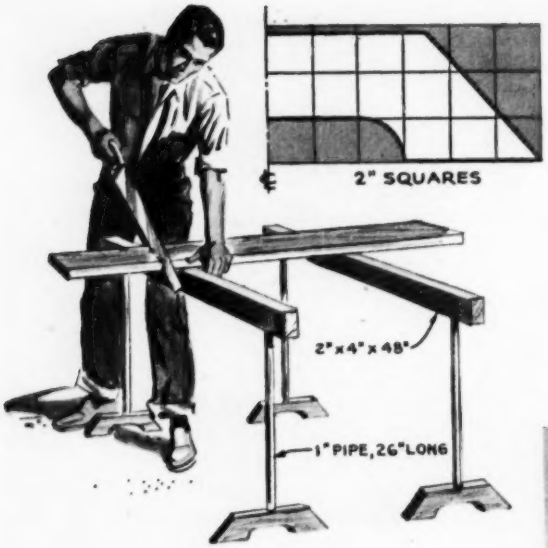
St. Regis Paper Company, Panelyte Division
230 Park Avenue, New York 17, N. Y.

Send FREE instruction booklet to:

Name.....

Street.....

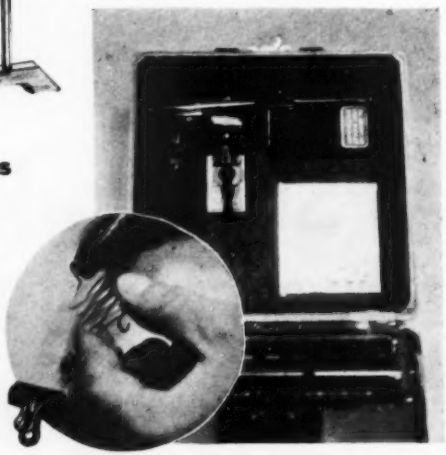
City.....Zone.....State.....



Sawhorses Fold Flat

A PAIR of these simple sawhorses will give years of light-duty service, cost practically nothing to build, and take little space to store.

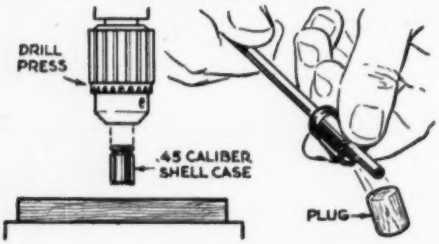
By swinging the legs parallel to the top, the horses can be folded flat, or the pieces can be quickly taken apart for carrying in a car. You can shape the legs out of lengths of 2"-by-6" as shown for a pleasing appearance or simply leave them straight.—*J. W. Welker, San Bernardino, Calif.*



Typewriter Carries Office Supplies

YOUR portable typewriter becomes a traveling office if you fit it out like this to carry extra supplies. Spring-type paper clamps, bolted to the inside of this cover, hold stamps, labels, eraser and dictionary. To hold pencils and pens, bend eyes on the ends of two small coil springs, bolt the springs side by side, and press the pencils between the coils. A sheet of addresses can also be taped to the cover.—*Phil McCafferty, Fort Bliss, Tex.*

Wood Plugs Are Easy to Cut with Cartridge Case and Drill Press



DRILL the primer out of a rimless or center-fire cartridge case and use it in a drill press to cut plugs to cover screwheads in cabinet or other wood projects. Nick the edge of the case with a triangular file to form teeth. A .45-caliber case will cut a plug to fit snug in a ⅜" hole. Other sizes may fill other needs. The plug is pushed out of the case with a small bolt.—*A. P. Truchot, Agawam, Montana.*

Clamp Made from Corner Braces

BOLT a couple of metal corner braces together, slip on a wing nut, and you have the handy C clamp at right. The longer the bolt you use, of course, the wider the clamp jaws will open. Strong enough for light work, the clamp can be taken apart at any time.—*Ken Murray, Colon, Mich.*

Texaco Tips

★ on car care

How to keep your air filter clean

If your carburetor air filter is clogged with road grit and grime, it cannot perform its necessary function. The result? —your engine suffers from metal-wearing matter. To keep it clean, free from clogging sediment, see your Texaco Dealer. If necessary, he will remove the filter element and wash it thoroughly in kerosine. Oil bath type filters will get an oil change to the right seasonal grade, as needed. Extra care like this helps keep your car running better and running longer.

How to get that "cushiony" ride

Note the tight-clinging "collar" of *Marfak* lubricant on the front suspension. *Marfak* stays on the job far longer. It's extra-stretchy . . . forms a tough protective coating between points of friction and wear. With *Marfak*, you enjoy 1,000 miles or more of *cushiony* smooth motoring. Your Texaco Dealer lubricates your car by chart, never by chance. His lubrication guides include instructions for every make and model of car. Today, get *Marfak* lubrication. See your Texaco Dealer . . . *the best friend your car has ever had.*

THAT "CUSHIONY" FEELING LASTS LONGER WITH MARFAK Lubrication

TEXACO

THE TEXAS COMPANY

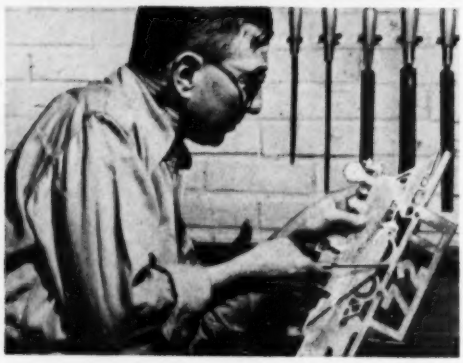
TEXACO DEALERS

in all 48 states

Texaco Products are also distributed in Canada and in Latin America

TUNE IN: METROPOLITAN OPERA radio broadcasts every Saturday afternoon. See newspaper for time and station.

DO-IT-YOURSELF PROJECT WITH TRIPLE PAY-OFF



In making his own house sign (for example), this man is (1) saving money, (2) adding to the value of his home, and (3) having a lot of fun doing it.

What's more, his pride of achievement is heightened by his possession and use of *good* files. They're NICHOLSON. This and BLACK DIAMOND are the most famous two brands in the world.

He knows their teeth are sharp, evenly high, of uniform hardness, and have extra-long life. They're the choice of both the professional and the exacting amateur craftsman. They've the quality good hardware and tool-supply dealers like to recommend.

FREE—"*File Filosophy*," Nicholson's famous 48-page illustrated book on kinds, use and care of files. Shows and describes many types of files for use on all sorts of projects comprising hard or soft metals, wood, plastics, etc. ***Send for it.***

NICHOLSON FILE COMPANY
19 Acorn Street, Providence 1, R. I.
(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)

NICHOLSON U.S.A. — BLACK DIAMOND TRADE MARK

NICHOLSON FILES ***FOR EVERY PURPOSE***

Young Scientists Win What They Want

[*Continued from page 153*]

Adult scientists often find it hard to believe that young people can be so talented. Dr. Remington Kellogg, director of the National Museum of the Smithsonian Institution, who was chairman of the board of 11 judges in 1952, commented: "The whole fair was a great surprise to all of us. We were impressed by the efforts, interests and excellence of the exhibits. . . . It was extremely difficult to select the winners." Dr. Kellogg was particularly impressed with an exhibit of insects entered by Don Ray Davis of Oklahoma City. Don had found some insects that even Dr. Kellogg's institution, with a collection of more than a million, didn't have.

At Oak Ridge, Tenn., last year, the entries were so good that the judges—including some world-famous scientists—deliberated five hours, and even then had to make two extra second-place awards.

For Finalists: An Exchange of Ideas

Officially, the competition is for 12 "wish awards"—scientific equipment or books which each winner feels will help him continue his study and experimentation. A first award is worth $125; second, $75; third, $50. There are two of each of these in the physical sciences and two in the biological sciences. Boys and girls compete separately.

Actually, the rewards that go to each finalist are far more valuable than the prizes won by those who place first, second or third. First is the trip itself—to Philadelphia in 1950; St. Louis in 1951; Washington, D. C., in 1952; Oak Ridge, Tenn., in 1953; and next month to Lafayette, Ind., home of Purdue. Then come the opportunities to visit places where scientists work—industrial, government and university laboratories—and to talk shop with the people who work there. Answers to questionnaires show that entrants value these opportunities more than anything else, for they bring encouragement, fresh ideas, new

[*Continued on page 264*]

QUIET ZONE

NOW... GO QUIETLY

This outboard motor is different. It's *quiet*. You slip away from the dock without disturbing your neighbors. You speed along without noise. You *talk* to your boating companions.

The Sea-Horse 5½ is *entirely* new. Suspension Drive. Air Intake Silencers. Exhaust Relief Silencer. Up-and-Off Motor Hood. Full Gear Shift. Separate 4-gallon Mile-Master Fuel System. Twist-Grip. Hi-torque power. And fitted for Ship-Master Remote Control! Never before have so many fine features been concentrated in a motor of this trim size — *the favored size that outsells all others!*

SUSPENSION DRIVE

With this revolutionary Johnson development, the entire engine is suspended from the stern bracket by four resilient connectors. This dissipates vibration that otherwise makes a vast sounding board of your boat.

FREE! Write for the new Sea-Horse Catalog. See your Johnson Dealer. Look for his name under "Outboard Motors" in your classified phone book.

JOHNSON MOTORS
500 Pershing Road, Waukegan, Illinois
In Canada: Mfd. by Johnson Motors, Peterborough

5 GREAT SEA-HORSES FOR 1954

ELECTRIC STARTING SEA-HORSE 25—25 hp. The "automatic" outboard.....**$498.00***
SEA-HORSE 25—25 hp.....**$410.00***
SEA-HORSE 10—10 hp.....**$297.50***
SEA-HORSE 5½—5½ hp.....**$210.00***
SEA-HORSE 3—3 hp.....**$145.00**
SHIP-MASTER REMOTE CONTROL—Fits Sea-Horse 5½, 10 and both 25's. From . **$29.50**

*OBC certified brake hp at 1000 rpm. Prices f.o.b. factory, subject to change. *Includes Mile-Master Fuel System.*

Johnson
SEA-HORSES
FOR DEPENDABILITY

SEA-HORSE
5½

The Sea-Horse 5½ is the first outboard motor ever to win a citation from the National Noise Abatement Council.

Gus Defies the Elements

[Continued from page 160]

"I know," Gus said, his eyes sweeping over the landscape.

The usually peaceful canyon had been transformed in a few minutes to a scene of wild turmoil. The trees along Rolling Rock Creek leaned far over under the force of the wind, and sheets of rain lashed at their branches. A long drift log had wedged across the stream a little way below the truck. Drift had piled against it to form a dam.

The Flood Creeps Closer

Even as Gus watched, a giant uprooted tree rushed at the dam, struck it with the power of its tons of driven weight, and rose 20 feet into the air, quivering there like a shaken bush. The entire tree had become part of the dam.

The water now lapped at Gus's knees. Piled up behind the dam, it was two feet over the stream's normal banks. Near the truck, sections of the bank had begun to crumble away and topple into the current. The truck driver was hanging on to Gus's arm, shaking it, and his voice was shrill with terror.

"We've got to get out of here!" he cried.

Gus turned to face him, his gray eyes calm and level. His big, work-worn hands fumbled with his pipe, tamping in tobacco with a wet thumb.

"Don't panic on me, man," Gus said. "If we leave that truck here, within the hour it'll be lost, toppled into the drink, cargo and all."

"But we can't do anything by staying here," the driver protested, "except get drowned ourselves."

"Maybe," Gus said, his eyes suddenly narrowing with thought.

He moved swiftly now, stooping to open his tool kit and bring out a coil of primary ignition wire. With his knife he quickly stripped off the insulation, and with three feet of soft copper wire in his hands, began wrapping it again and again around the long blade of his screwdriver. At the other side of the truck, Gus raised the hood, stooped to place one end of the copper wire on one battery terminal, while he rapidly struck the other end back and forth across the opposite battery post. Blue sparks flew, and the scent of ozone drifted off on the wind.

A moment later, Gus was on his way back to the first side of the truck, stripping the wire from the screwdriver blade as he went. He reached down into the deep distributor-shaft recess with the blade, withdrew it with the troublesome spring clinging to the end. With a few deft movements he rammed the distributor in gear correctly, slipped the spring on the stud below the washer, tightened it in place, connected the spark vacuum-control tubing, slammed the hood down and latched it.

"Get under way, Steve," he yelled. "Back her out on the road, away from that creek bank. Quick, man! That bank's about to give way."

A half-hour later, Gus drove his dripping car into the Model Garage. Steve Holloway pulled the truck up under the canopy of the pumps and leaped out to enter the garage.

Gus Describes Screwdriver Magnet

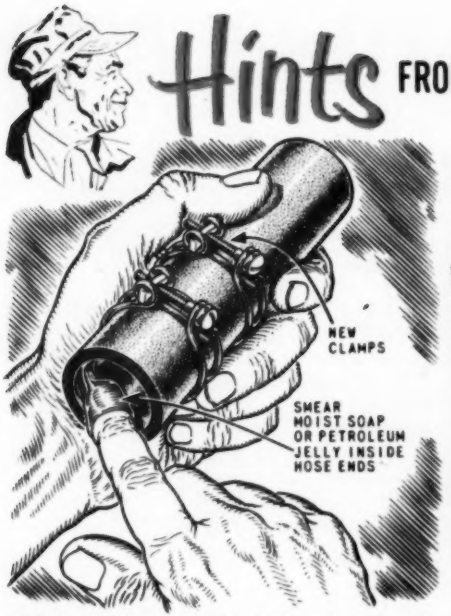
"Brother!" he exclaimed. "That was a close one. How'd you get that spring out of there so quick, Gus?"

"Always remember," Gus told him, "what I darn near forgot up there in the hills. You can make a strong magnet out of a screwdriver blade, provided it's of good steel, by wrapping it with wire and making and breaking juice through it from a battery. I should have thought of it sooner. Guess I'm getting absent-minded in my old age."

"You sure are, Gus," Stan Hicks called from the grease rack. "Dump your shoes. Don't you know they're full of water?"

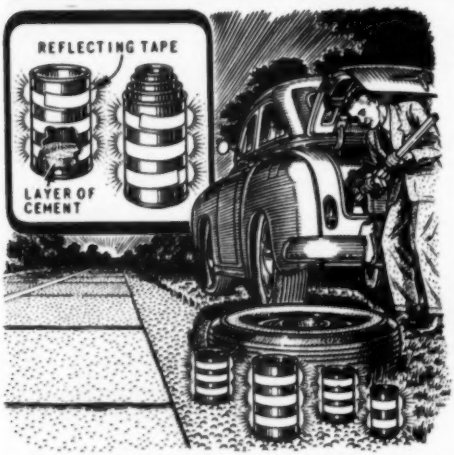
Gus looked over to his helper and grinned as he scratched a match on the bench and applied it to his pipe. Come to think about it, he'd forgotten to light up when the thought about the magnet finally struck him. END

Hints FROM THE MODEL GARAGE



Rub soap inside hose ends when installing new connections between the radiator and motor block. They'll slip on the fittings easily and save you much pulling and tugging. For a thorough job, sandpaper the rust off the fittings and use new clamps.

Bolt one or two truck-tire rims to the side of a pickup truck to keep cylindrical objects like oil drums or rolls of roofing from rolling about. Bolt the rims as high up from the floor as the sides will permit to keep the loads from tipping out.

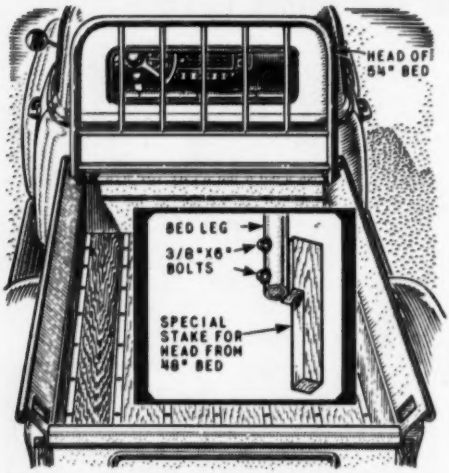


Wrap reflective tape around tin cans to warn passing motorists when you're stuck or changing a tire. Use cans of different sizes so they will nest compactly in the trunk and pour a little cement in the bottom of each can to keep them from blowing over.

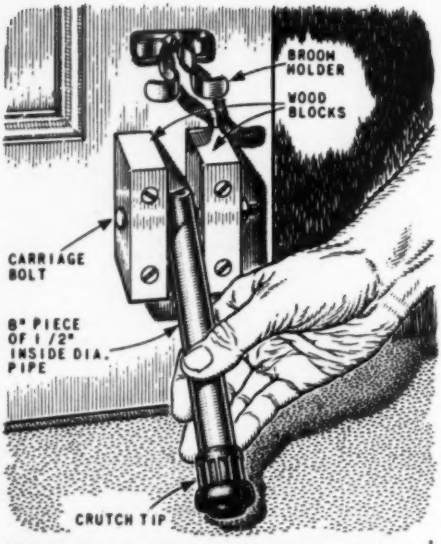
Put a plywood end gate across a low trunk opening to keep tools from rolling out when transporting a large object with the trunk lid up. Set it back far enough so that it won't interfere with the latch and secure it with metal angles bolted to the floor.

Please turn the page for more auto hints.

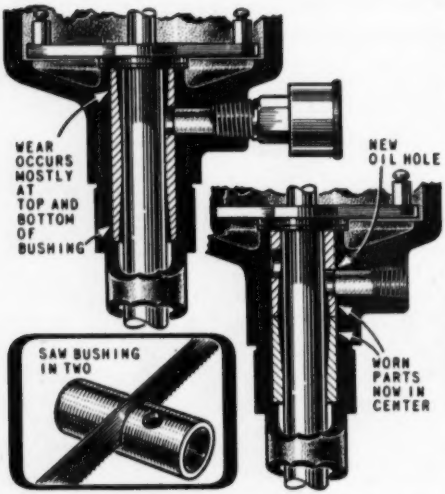
MORE Hints from the Model Garage



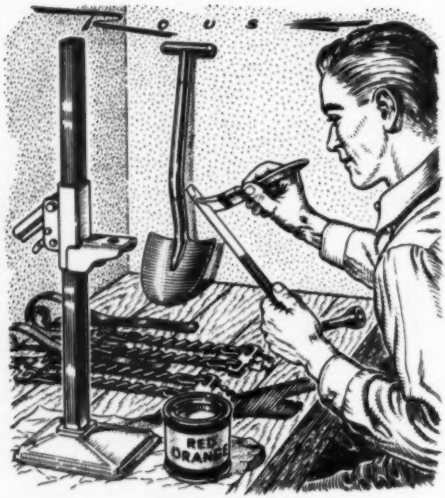
Use the head of an old metal bed to keep the load in a pickup truck from crashing through the rear window when you stop suddenly. Cut a hole in the body sides for the legs. Make the head of a narrow-width bed fit by adding wood extensions (inset).



Keep the garage door open while you back out by pivoting a piece of pipe on a bolt held by two blocks of wood screwed to the inside of the door. A rubber crutch tip keeps it from slipping and a spring clamp stores it up out of the way.



When a distributor bushing wears, play in the shaft affects engine performance. Because most wear is at the bushing ends, you can save fitting a new one if you cut the old bushing in two, drill a new oil hole and put it back with the center sections out.



Paint car tools bright orange or yellow to make them easier to see. Then you'll be less likely to leave them at the roadside when you take them out in snow or at night to change a tire or make repairs. The paint will also keep them free from rust.

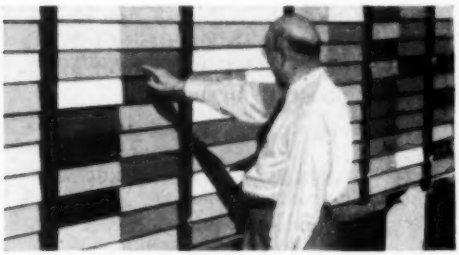
SWP HOUSE PAINT

Lasts Longer...Saves Money

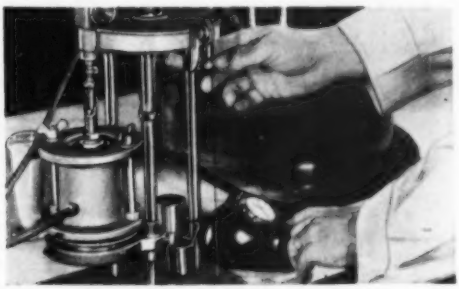
It pays to be "choosy" when you select the *brand* of house paint to be used on your home. Whether you employ a painting contractor or not, the price difference between world-famous SWP® House Paint and house paint of ordinary quality will mean less than $5.00 for the average-size, complete house job. This slight difference in cost pays for years of extra wear and is one of the wisest economies you can make.

In 1953, Sherwin-Williams SWP House Paint was used to paint more homes in America than any other brand. Why? Continuous research in Sherwin-Williams Testing Laboratories and in the field has insured constant improvement and the top-quality performance of SWP. You'll be money ahead when you discover there *is* a difference in house paints!

Tested for Your Protection . . . A most exacting procedure of quality-control testing through every step of manufacture, from raw materials to finished product, assures maximum beauty and protection in SWP House Paint. Laboratories in every Sherwin-Williams factory are charged with the responsibility of absolute quality control of every gallon produced.



White and Colors That Last . . . All over the country, in all climates, Sherwin-Williams maintains test stations where house paints of every type and description are exposed to years of weather and wear. SWP white that stays *whiter* and SWP colors that maintain their brilliance are the direct result of this painstaking research.



Ease of Application Assured . . . Invented by Sherwin-Williams Testing Laboratories, this instrument, known as the high shear viscometer, is an extraordinary development which makes possible the scientific measurement of the brushing qualities of paint. This testing procedure has made possible the superior brushing qualities in SWP House Paint which insure remarkable ease of application.

FREE: For full information on SWP House Paint and lots of interior decoration ideas, too, ask your dealer for a copy of the 44-page "*Home Decorator*" or write to The Sherwin-Williams Co., 1260 Midland Building, Cleveland 1, Ohio.

Let us recommend a reliable painting contractor.

Go to the store that displays this famous trade-mark . . .

SHERWIN-WILLIAMS SWP HOUSE PAINT

ON TV . . . TUNE IN THE SUPER® KEM-TONE SHOW, STARRING RAY BOLGER . . . ABC NETWORK EVERY WEEK

Beautify your old rooms

with easy-to-apply Gold Bond Insulation Planks!

Take any old room. Get some low-cost, easy-to-handle Gold Bond Insulation Planks . . . you can put them up yourself, and you'll soon have the best-looking, most comfortable room imaginable!

Easy to do because Gold Bond Insulation Planks are ready-cut. Interlocking edges slide together, hiding nails or staples (whichever you use). No painting either, for planks come in ivory or variegated blend of four pleasing colors. Insulation is built-in to keep winter heat *in*—summer heat *out!* For a handsome, sound-absorbing ceiling use Gold Bond Insulation Tile.

Get these "Do-It-Yourself" materials today at your Gold Bond dealer. For more information mail coupon today! National Gypsum Company, Buffalo 2, New York.

MAIL COUPON TODAY

NATIONAL GYPSUM COMPANY
Dept. PS-44, Buffalo 2, N. Y. $

Please send me free folder, "Four Ways to Give Your Home New Beauty."

Name.....

Address.....

City.....*County*.....*State*.....

Young Scientists Win What They Want

[*Continued from page 258*]

horizons. Any scientist who has ever spent an hour exchanging ideas with high-school students can be assured that his reward is great: the youngsters love him for it.

What happens to science-fair finalists? "It is too early to say how many become actual scientists," reports Joseph H. Kraus, the fair's coordinator. "But the evidence indicates that judges of local science fairs are doing a remarkable job of recognizing potential scientific manpower while the boys and girls are only sophomores, juniors and seniors in high school."

Margaret E. Patterson, executive secretary of Science Clubs of America, checked up last May and found that almost half of the 102 finalists in the first three national fairs had gone on to college, all but three of them concentrating in scientific or engineering fields. Most of the others were still in high school, planning to go to college.

Of last year's 71 finalists, all but a dozen planned to follow a career in science, engineering or medicine.

"For the Fun of It . . ."

How do you get a youngster interested in scientific matters? Twenty percent of last year's finalists credited home influences with having drawn them into the world of science. Forty percent named their schoolteachers. Others listed science magazines, science-fiction movies and friends.

Whatever the start, science fairs help to nurture youngsters' interest and carry it over into the adult years. Science teachers themselves applaud the statement of Dr. Irving Langmuir, a Nobel prize winner in chemistry. "If you work out a small problem by yourself for the fun of it," he told science-fair exhibitors at Socorro, N. Mex., "you will learn more science than they can teach you in school." END

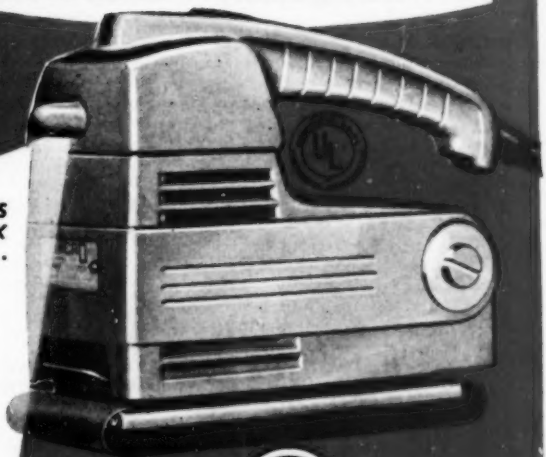
NEXT MONTH* Popular Science *will tell you about—and show you through—Uncle Sam's free college for ship's officers.

ANNOUNCING AMERICA'S *Greatest* PORTABLE SANDER

OFFERS YOU MORE THAN ANY OTHER—REGARDLESS OF PRICE!

READY FOR ALL HOME JOBS and Industrial Applications!

LIGHTS YOUR WORK AS YOU SAND...

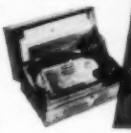


The ONLY Portable with ALL these features:

1. MOTOR GUARANTEED AGAINST BURN-OUT DURING OWNERSHIP OR REPLACED FREE.
2. OVER 1000 HOURS OF CONTINUOUS SANDING WITHOUT BREAK-DOWN IN LABORATORY ENDURANCE TRIALS.
3. REMOVES MORE MATERIAL WITH LESS UPKEEP THAN ANY SANDER AT ANY PRICE.
4. WORK-LIGHT IS STANDARD EQUIPMENT—A SYNCRO FIRST FOR PORTABLE SANDERS OF ITS TYPE.
5. VIBRATION-ABSORBING HANDLE FLOATS IN RUBBER (PATENT PENDING).
6. EASY TO USE, HAND OPERATED, POSITIVE PAPER HOLDING CLAMPS.
7. ONE HAND OPERATION — NO JUMPY, TWISTY TORQUE TO FIGHT.
8. MOST POWERFUL RECIPROCATING SANDER MOTOR (PATENTED).
9. NO OILING—POWER UNIT FLOATS IN RUBBER (PATENTED). NO CAMS, BUSHINGS, BELTS, PULLEYS OR GEARS TO WEAR OUT.

only **39.95**

OTHER SYNCRO SANDERS:
No. 504
$19.95



No. 504-D DELUXE SANDER IN STEEL CARRYING CASE: $22.95

SYNCRO NEW '900' SANDER

WITH BUILT-IN LIGHT — INDUSTRIALLY-RATED

Present, prospective sander owners! Here's the new lowcost '900' SYNCRO—best all around portable for home use ever—costing less than many others! Try this superior, powerful tool on "do-it-yourself" jobs—save what '900' costs (or more) depending on type of job. Because '900' is so new—and your dealer may be sold out—do this: Send $39.95 and your favorite dealer's name with coupon—and we will ship '900' direct to you—and see that your dealer profits from your purchase. Then—use your '900'—see how it sands better, quicker, easier, smoother and-handed than more costly "backing" torque-knobbed heavier "two-handed" portables do! If not 100% satisfied—return '900' prepaid, undamaged, within 10 days from receipt—we'll refund $39.95 promptly! Or write for FREE facts today.

Dealers—See Your Jobber!

Now Send This Coupon

SYNCRO CORPORATION
Dept. 3-44
Oxford, Michigan

TRIAL ORDER or FREE '900' CIRCULAR

SYNCRO CORP., Dept. 3-44, OXFORD, MICHIGAN

☐ *TRIAL ORDER:* I enclose $39.95. Send postpaid New No. '900' Sander with accessories . . . on 10 Days Money Back Trial Offer.

☐ *C.O.D. ORDER:* I enclose $5. Send '900' C.O.D. I will pay balance ($34.95) plus postage, C.O.D. fee, on arrival. Same 10 Day Money Back Trial.

☐ *FREE FACTS:* Send for new free Syncro Sanders Circular. Free "How to Sand" booklet.

Name_____

St. and No._____

City_____ Zone____ State____

Dealer's Name, Address_____

This oil-pumper needs Tough-but-oh-so-gentle piston rings*

Oil pumping is just the start of expense and trouble—the first danger signal from worn-out piston rings. The longer you let those old rings stay in, the more oil you'll use, the more power you'll lose, and the bigger your repair bill will be!

As your engine gets older, it runs hotter because of accumulations in the cooling system. The cylinders wear tapered and out-of-round—need more oil on the walls.

It requires a special type of piston rings—replacement rings—to deliver this extra oil, under full control, without waste.

Hastings makes replacement rings exclusively, devotes all its research on the highways and in the laboratory, to the particular replacement problems of each make and type of engine.

That's why Hastings Rings *stop* oil-pumping, *check* cylinder wear, *restore* engine performance—in re-ring, re-bore and re-sleeve installations.

So go to your motor specialist at the first sign of oil-pumping or performance drop-off. If rings are the trouble, ask him to install a Hastings Steel-Vent replacement set. Truly the best money you can spend on your car! Hastings Manufacturing Company, Hastings, Michigan: Hastings Ltd., Toronto; Piston Rings, Spark Plugs, Oil Filters, Casite, Drout.

HASTINGS
STEEL-VENT PISTON RINGS

U. S. Climbers Assault Makalu

[*Continued from page 99*]

violent political activity, a broken marriage, combat in battle. Intense sustained anxiety, above almost everything else, either produces or is associated with the physiological changes that result from stress.

Stress diseases include stomach cramps, rheumatoid arthritis, battle fatigue, asthma, duodenal ulcers, hypertension, some heart diseases, and possibly ulcerative colitis. These ailments are increasing in civilized nations. If stress can be studied in the mountains, it may be ameliorated elsewhere.

For research purposes, the expedition will be disappointed if Makalu is not tough enough.

There is little chance of this.

Is There a Way to the Top?

For more than 30 years every expedition on the way to attempt Everest has also tried to figure out a way to Makalu's summit. None has.

Its awesome rigors have kept anyone from trying to climb the soaring peak up to now. William Siri and his Californians are the first men to approach the mountain. Indeed, only one expedition has been anywhere near Makalu's base. That one, in 1951, included Hillary and Eric Shipton. From slopes nearby, they looked down upon the Barun Glacier and the ice falls surrounding Makalu.

Knowledge of animals of the Everest-Makalu area, Siri points out, will shed new light on how life exists in a high-stress environment. Accordingly, two members of the expedition have been designated to gather animal specimens.

Plants will provide still more knowledge of life under extreme conditions.

As you might expect of a party of scientists, the most careful preparations have been made for attacking Makalu.

There will be two-way radio for communication between camps and the two-man parties that will make the final assaults on the summit. A base-camp radio will bring in weather news. (Maka-

[*Continued on page 268*]

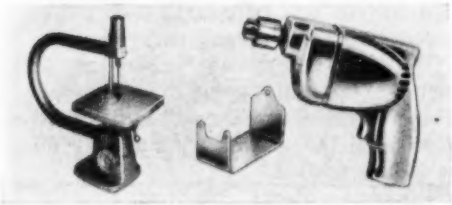
"We Really Make Hardware Week a Big Event for You at Cummins,"

says Paul Jones, president, Cummins-Chicago Corp.

Hardware Week, this year, is April 16 to 24—and it's a big event, with hardware stores everywhere offering you terrific special buys. At Cummins, we go all out to help our good friends, the hardware dealers, with Hardware Week bargains in power tools.

Again this year, good hardware stores everywhere will be featuring not one . . . but *three* Cummins Power Tools specials, all of them wonderful buys. Most outstanding buy of them all is Cummins NEW **do-it** Jig saw that you can operate with any good-quality drill, ¼" or larger, you now own. The **do-it** Jigsaw sells for only $24.95, complete, with no extra expensive motor to buy. Here are the Cummins Specials to look for at your Hardware store during Hardware Week:

Cummins Hardware Week Special No. 1



do-it Jigsaw, Drill Stand, Ball•Rite 44 Drill

Regular $56.15 Value—
Hardware Week Only **$49.88**

Save over $6 on this outstanding bargain offer! Ball•Rite 44 finest industrial quality ¼" drill, mounted in stand, runs the jigsaw. Or, can be used independently, of course, for drilling, buffing, sanding, polishing.

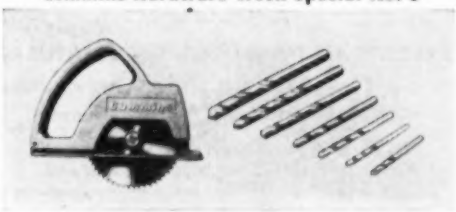
Cummins Hardware Week Special No. 2

do-it Jigsaw and Fixmaster Drill Kit

Hardware Week Only
Both for **$42.95**

Kit has 36 pieces, including Cummins Perm-Align Drill, which powers jigsaw. Complete outfit for drilling, sanding, grinding, buffing and jigsawing. Big value!

Cummins Hardware Week Special No. 3



Circular Saw Attachment and Set of 7 Drill Bits

Hardware Week Only
with Any Cummins ¼" Drill **$1.88**

Less than factory cost! You save almost $8. Buy any Cummins ¼" Drill at $17.95, $21.95 or $29.95 and for just $1.88 more you get this sensational 4" saw and drill bit combination.

About the New do-it Jigsaw

The NEW do-it Jigsaw featured in Offers No. 1 and 2 runs with any good drill, ¼" or larger, you now own—big capacity . . . cuts wood up to 2" thick to center of 28" circle. Blade turns 90° for unlimited length of cut without interference from overarm • Overarm quickly removes for unlimited saber sawing, sanding and filing sticks • Exclusive Recipro-Flo Drive gives smooth balanced power without blade vibration or "flutter". . . blade breakage is reduced to minimum • Driving mechanism (exclusive Recipro-Flo Drive) operates in self-lubricating bearings for long, trouble-free service • Multi-purpose chuck allows use of either pin-type or blank-end blades • Built-in blower keeps cutting line sawdust-free for greater accuracy • Large work table tilts to any angle up to 45° for precision angle cutting • Adjustable hold-down foot gives hairline cutting accuracy in any thickness of wood • Jigsaw comes complete with Pulley, V-Belt, 3 Assorted Saw Blades, Adjusting Wrench and Mounting Hardware. Ready to operate with your drill. $24.95

Go to your hardware dealer now and reserve one or more of these Cummins money-saving buys. Then, you'll not be disappointed! If you would like FREE illustrated material on any of these outstanding power tools, drop me a line.

Sincerely, Paul Jones
PRESIDENT

COPYRIGHT 1954 CUMMINS-CHICAGO CORP.

CUMMINS-CHICAGO CORP., 4740 N. Ravenswood Ave., Chicago 40, Ill. In Canada: 334 Lauder Ave., Toronto 10
***Makers of* MAXAWS, MAXDRILLS, BALL•RITE and PERM-ALIGN DRILLS, FIXMASTER KITS, do-it SHOP**

I installed

because...

IT OFFERS ALL THESE IMPORTANT FEATURES

B. F. Goodrich Koroseal is the ONE floor tile that combines these 4 desirable features:

NEVER NEEDS WAXING! Minimum care — stays bright with an occasional washing and light buffing.

DEFIES DESTRUCTION! Super-resistant to oils, fats, greases . . . . even cleaning fluids and alkalies.

ANTI-SLIP SURFACE! Safe to walk on, always!

MAXIMUM WEAR! The same material from top to bottom — no coating, no lamination.

You increase the value of your home when you install beautiful B. F. Goodrich Koroseal Floor Tile . . . and you can do the job yourself! The 80 gage thickness, made especially for homes, is *easy* to install when you use the B. F. Goodrich Installation Kit. Ask your dealer for guidance.

Send for FREE full color folder.

B. F. Goodrich Co., Dept. PS4
Flooring Div., Watertown 72, Mass.

Name_____

Address_____

City_____ State_____

U. S. Climbers Assault Makalu

[*Continued from page 266*]

lu gets exactly the same storms that Everest does. This means blizzards, 100-m.p.h. winds, 50°-below-zero cold.)

Other equipment includes two 8-by-10-foot tents, smaller two-man tents, primus stoves, standard air mattresses, and, for bridging crevasses, a 30-foot aluminum ladder that breaks down into six-foot lengths for carrying. Although the Everest expedition last year used oxygen, the Makalu expedition will take none—except for medicinal purposes. No mechanized sledges, winches or weasels (snow trucks) will be used. The expedition had no way of getting such things across Nepal's mountains and valleys.

Why don't they use helicopters or planes to bring in supplies or equipment? They can't. Helicopters, with no forward motion on the ground, cannot take off at high altitudes.

Parachute drops are not feasible, either. An enormous dropping area is needed—not a small ledge or peak. Arctic explorers, on wide ice fields, can be supplied by air; mountaineers cannot.

Pathway to the Clouds

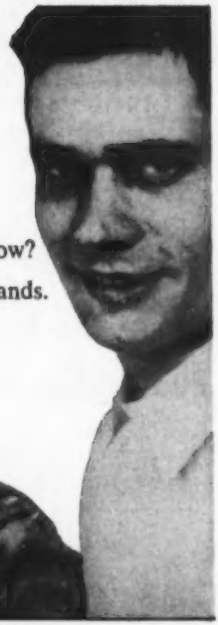
To reach Makalu, the Californians crossed the Pacific to Calcutta, India; then rode a narrow-gauge railway to Jogbani (altitude: 300 feet). From there they marched 175 miles across Nepal—the first white men to pass through the upper Arun River valley.

Near the valley's end, they will turn west onto the Barun Glacier. Here they will have to ascend, within 20 miles, from an altitude of 4,500 feet to 17,500. Severe stress can be expected to burden the men on this stretch. At the end of this hike upward, the men will still have two miles of mountain to climb.

To do it, they will have to find a path across the Barun, so far untrod by white men, and then that path up Makalu—the route Hillary and other Everesters could only wonder about. END

NEXT MONTH **Popular Science** ***will show you the fanciest tree house you ever saw, and tell you how it was built.***

"Sure, I'm Confident!"



"I have the tools to do the job!"

Start a project feeling like this — and, brother! — you'll do a wonderful job! And you *can* start with that kind of confidence. How? *Tool up with Stanley!* They're the finest tools you can put in your hands.

No. 130A

"YANKEE"® SPIRAL RATCHET SCREW DRIVER

Can be used with one hand

Just push the handle — the tool does the work! Drives or draws. No need to use both hands — amazing, quick-return spring brings handle back automatically after each stroke. This big, rugged, professional screw driver, with 3 most-used bits, $7.70.

No. 11½

FINEST HAMMER! *Drive the nail in straighter* with the famous *Stanley "100 Plus"!* Extra power in every stroke — more accuracy, too — thanks to Stanley's balanced 2° toe-in design. Choice of curved or ripping claw. $3.50* (16 oz.)

**Western prices slightly higher.*

No. X 226

FINEST RULE! Take direct readings of inside measurements with the *Stanley "100 Plus"* Zig Zag Extension Rule. Slide and rule reading centered at one point. 6′ rule, 8″ slide. $2.75 wherever fine tools are sold.

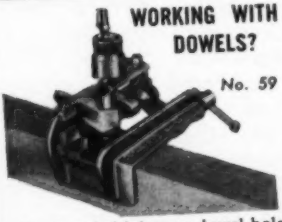
THE TOOL BOX OF THE WORLD

STANLEY *Tools*

HARDWARE • ELECTRIC TOOLS • STEEL STRAPPING • STEEL

USE COUPON for copy of **STANLEY TOOL GUIDE** and free literature about Stanley and "Yankee" Tools.

WORKING WITH DOWELS?



No. 59

Do doweled joints or dowel holes give you trouble? Try the *Stanley Doweling Jig*. You'll bore holes of exact accuracy in edge, end or surface of work. You *can't* go wrong (see illustration). $5.75* with 6 different sized guides, wherever fine tools are sold.

STANLEY TOOLS, 444A Elm Street, New Britain, Conn. or
STANLEY TOOL CO. of CANADA, 444A Stanley Street, Roxton Pond, Quebec.

- ☐ Please send me STANLEY TOOL GUIDE for which I enclose 25¢.
- ☐ Please send me *FREE* STANLEY DOWELING JIG FOLDER P51A.
- ☐ Please send me *FREE* "YANKEE" TOOL BOOK Y41.

Name_____

Address_____

City_____ Zone_____ State_____

REJOICE !!

With Millions of HAPPY USERS!

Enjoy The Latex Paint with Everything BUILT IN!

SATIN LUMINALL

With Satin Luminall the job is done when common paints have just begun. Thanks to exclusive concentrated formula, one coat primes, seals, undercoats and finishes! No thinners, wall-dopes or solvents to buy! Scrubbable!

FREE! 30 REAL PAINT CHIPS IN "MATCH-A-CHIP" BROCHURE . . . COLORS EVERYONE LOVES

LUMINALL PAINTS
Dept. 17, 3617 South May Street
Chicago 9, Illinois

Please send FREE "Match-a-Chip" Color Chart and complete information on Satin Luminall, the latex paint with everything built in.

Name_____

Address_____

City_____ Zone____ State_____

Luminall Paints

Chicago 9, Newark 5, Los Angeles 1
Luminall Paint Dealers Throughout the U.S.A. — See Yellow pages Phone Book
MILLIONS OF HAPPY USERS KNOW THE LUMINALL LABEL IS THE FINEST GUARANTEE IN PAINTS

Small Nash Is Fast and Fancy

[*Continued from page 109*]

gas after you've run the tank dry or have let the automobile sit for a long time in your garage.

The buyer of a Metropolitan convertible can have either a black or tan top. Top boots and continental spare-tire covers are made in matching colors.

Wheels of both convertibles and hardtops come in Mist Gray, and so does the upper body of all hardtops. But the purchaser can order the rest of the car painted Spruce Green, Canyon Red, Caribbean Blue or Croton Green.

235,000 Viewers Gave Opinions

Fancy is the word for the inside, too. Gold-colored vinyl material covers that rear bench, and a combination of genuine ivory leather, beige nylon, and black-and-yellow-striped Bedford cord plushes up the front seats.

This newest and smallest of the Nashes is the result of a marketing poll taken back in 1950.

You may remember that Nash sent its small, experimental NXI touring the U.S. that year and asked 235,000 viewers how they liked it. Ninety percent liked it fine. Now, after 20 major changes, the hand-built NXI has become the Metropolitan. Though produced in England—to keep costs down, Nash says—the car will be sold only in this country.

Long before 1950, the idea behind this Nash with the 85-inch wheelbase was simmering in the mind of Nash's president, George Mason. Using his motorcycle know-how, Mason started working on the car 11 years ago, conceiving it as a three-wheel, 10-horsepower machine. He stuck with it until it emerged as the first really light car built by a major American auto firm, and the first passenger car engineered in the U. S. and built entirely abroad for sale here. END

Man's Greatest Need

What most of us need is more horsepower and less exhaust.—*Texas & Pacific Topics.*

SHOP BY MAIL & SAVE — GOV'T. SURPLUS AND OTHER BARGAINS — MANY ITEMS JUST RELEASED

ALL ITEMS ON THIS PAGE
BRAND NEW

DOUBLE ACTION
HYDRAULIC CYLINDERS

NEW MANUFACTURE

ITEM #224—3¼" bore, 24" stroke, will lift 8250 lbs. with 1000 P.S.I. line pressure. ½" pipe thread ports—1⅜" stress-proof ground, polished & plated solid steel shaft. Overall length closed 36". Ship. Wt. 50 lbs. F.O.B. Chicago ... **39.60**

ITEM #16-C—1½" bore, 26" stroke. Will lift 1760 lbs. with 1000 lbs. pump pressure. Great for hay loaders, etc. 1" stainless steel piston rod. Postpaid..... **16.95**

ITEM #355 — 2½" bore — 7½" stroke. Mfgd. by Delco-Remy. Clevis mounting. ⅜" pipe thread ports. Will lift 5000 lbs. F.O.B. Chicago **16.00**

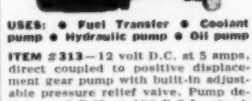
JUST RELEASED!
BLACKHAWK HAND-HYDRAULIC PUMP

ITEM #82. Perfect for Hydraulic Presses, Snow Plows, Farm Wagons, Jacks, and Farm Plows. A few easy strokes of the 20" handle and you can lift 5000 lbs., using Item 355—Hydraulic Cylinder. Blackhawk Model P-151—complete with built-in oil tank and release valve. Rated 1200-8400 lbs. per square inch. Dim. 9"x7"x6". Ship. wt. 35 lbs. Worth much more. F.O.B. Chicago..... **22.50**

AUTOPULSE
ELECTRIC PUMP

ITEM #117 — rated 24 volts, .6 amps, used as fuel pump for alcohol, gasoline, etc. on boats, trucks, or other equipment having a 24 volt system. ⅛" pipe thread ports, may be changed to a 6 or 12 volt operation by changing or rewinding solenoid. **4.95** Postpaid

THOMPSON
ELECTRIC FUEL PUMP



USES: • Fuel Transfer • Coolant pump • Hydraulic pump • Oil pump

ITEM #313—12 volt D.C. at 5 amps, direct coupled to positive displacement gear pump with built-in adjustable pressure relief valve. Pump delivers 1 G.P.M. at 100 P.S.I., standard ⅛" pipe thread ports separate outlet port provided for relief valve. Dimensions 7¾" x 2¾" x 4¼". Shipping Weight 8 lbs. F.O.B. Chicago..... **12.50**

FREE SPRING-SUMMER EDITION
1954 CATALOG, 52 PAGES, chuck-full of unsurpassed War Surplus Equipment Bargains for farm, home, factory and workshop. Write today.

PESCO GEAR TYPE
HYDRAULIC PUMP —Compact— Powerful—Reliable

—ITEM #160—Especially designed for belt drive from fan belt, power take-off, drive pulley, electric motor or small gas engine. Equally suitable for direct coupling. Pedestal type mounting with two bolt holes for ⅜" hold-down bolts. Standard ½" pipe thread inlet and outlet ports. Delivers 4.5 GPM at 1000 PSI at 2800 RPM with 3 HP. Will actuate one item #224, 3¼" bore, 24" stroke cylinder in 10 seconds. Hardened steel gears turn in dense oilite bronze bearings. Rotation — clockwise facing shaft. Guaranteed trouble-free service. Ship. wt. 6 lbs. F.O.B. Chicago **22.50**

ITEM #70
PUROLATOR
OIL FILTER

A perfect permanent element oil filter to keep your motor oil or hydraulic fluid clean at all times. Protect your pump or engine with this unit. Just turn the handle and the element is clean. Standard ⅜" inlet and outlet ports accommodate 16 gallons per minute. Shipping wt. 4 lbs. $13.00 value. NOW ONLY..... **5.95** Postpaid

ITEM #371V — SAVE $30.30 ON THIS Brand New—Pesco
HYDRAULIC CONTROL VALVE

FOR SAFE, POSITIVE CONTROL OF HYDRAULIC CYLINDERS AND MOTORS—• BUILT-IN RELIEF VALVE —factory set at 1200 P.S.I. • FOUR-WAY VALVE—to operate one double acting cylinder • OPEN CENTER—with valve in neutral, cylinder is locked in position and pump is unloaded. • SPRING RETURN TO NEUTRAL • FULLY BALANCED PLUNGER • EASILY STACKED INTO 2, 3, or 4 valve combinations for multiple cylinder operation. • 8 gal. per min. capacity at 1500 P.S.I.—⅜" pipe ports. • CONNECT PUSH RODS TO HANDLE FOR REMOTE CONTROL. • EASY MOUNTING • LIST PRICE—$46.80. • YOU SAVE $30.30. • DIMENSIONS—9"x4½"x2½"—Ship. Wt.—8 lbs..... **16.50** F.O.B. Chicago

VERSATILE
HYDRAULIC CYLINDER

ITEM #41C1C • 2" Bore • 6" Stroke • Double Acting • All Steel • ⅜" Pipe thread ports. Lift capacity 3100 lbs. with 1,000 P.S.I. line pressure. Ship. wt. 12 lbs. **Price ea. 12.50** F.O.B. Chicago

HYDRAULIC SPEED REDUCER with FINGERTIP CONTROL

Use For: • Reamer Drives • Midget Cars • Feed Mills • Canning Machines • Conveyors • Lathes • Milling Machines • Motor Boats • Cream Separators • Garden Tractors • Pumps

Variable output speeds from 0 to input speed available by moving control handle. Locking handle maintains setting. Use input power of ¼ to 1½ H.P. This Westinghouse-Oil Gear Unit consists of a variable displacement hydraulic pump feeding a fixed displacement hydraulic motor. Adjustable relief valves set at factory for 100 inch pounds of torque may be reset up to 200 inch pounds. Independent reverse control allows full output power and speed selection in either direction of rotation. Shafts measure ⅝" diam., include keyway. Input rotation is counter-clockwise facing shaft. Recommended input speed not to exceed 700 R.P.M. Over-all dimensions, 7½"x 2½"x11½", Gov't. acquisition cost $428.00. Shpg. wt. 31 lbs. Complete with 2 qts. of oil and full instructions. F.O.B. Chicago..... **54.50**

LIGHTWEIGHT—PORTABLE
GENERATING PLANT

ITEM #351—.3KW—500 Watts —120/240 Volts—2.6/1.3 Amp. —100% Power Factor—60 Cycle AC Single Phase. Electric Motors and Specialty Co. Generator directly connected to a 1 cylinder, 2 cycle, air cooled, rope starting Jacobson Gas Engine; 3600 RPM. Overall dimensions 18-5/16"x14"x10-7/8". Shipping weight 87 lbs. ..... **79.00** F.O.B. Chicago

AUTOLITE GENERATOR

12 Volts, 15 Amps, Model No. GFU-4105

ITEM #169—Use on farm tractors, marine, truck and industrial engines, for charging 12 volt batteries. 4 bolt flange mounted, center hole to center hole dimensions 3¼", for use with external voltage regulator, removable drive gear, may be replaced by pulley for belt drive. Shipping wt., 14½ lbs. Dimensions, 8½"x4"x6". F.O.B. Chicago **15.00**

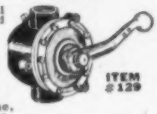
With Voltage Regulator **18.00**

SHOCK ABSORBER

ITEM #21

Brand new, use them to spring suspended vehicles, hoists, pumps, heavy and light machinery, compressors, etc., 11"x2" diameter, welded steel construction for extra strength. Originally used as a gas tank shock absorber for bombers. Shipping weight for 4—11 lbs. ..... 4 for **5.00** F.O.B. Chicago

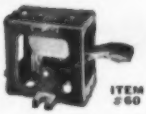
SELF-PRIMING
HAND FLUID PUMP
WITH STRAINER



ITEM #129

Fine general utility hand pump. May be used as a sump pump, barrel pump, fuel transfer pump, for water, oil, gasoline, insecticides, etc. Type D-2—Bronze and aluminum construction, ½ in. pipe thread ports. Capacity—200 Gal. per hour. Ship. wt. 6 lbs..... **11.95** F.O.B. Chicago

ROSS 4-WAY FOOT OPERATED
AIR VALVE



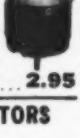
ITEM #60

BRAND NEW—For double-acting pneumatic devices. Fine for operating press, air vises, air machinery of many types. Heavy duty cast construction. No neutral position. Maintains pressure against the piston when the foot control is in the "Up" position. Threaded for ½" pipe. Dimensions of valve body: 7¾" long x 4¼" width x 7½" high. Net weight 28 lbs. A $64.00 value for only **19.50** F.O.B. Chicago

18" WIRE SPOKE WHEEL

ITEM #57—For use on motorcycle or adaptable for midget cars, trailers, small trucks, any wheeled vehicle. With bearing races and gear. Takes 18" tire. Wt. 19 lbs. A Real Value at. F.O.B. Chicago **3.95**

FAN MOTOR



ITEM #101—6 V. Fan Motor with double end shaft. Fine for automobile heaters, defrosters, fans, etc. Mfd. by Delco or Redmond. Single wire system. Shaft size ¼, speed 1750 RPM. Weight 2½ lbs. Shipping weight 4 lbs. Dimen. 3" diameter, 6" overall length. Postpaid..... **2.95**

D. C. GENERATORS

ITEM #91

Type R-1, rated 300 Amps. — 30 Volts. Mfd. by Jack & Heintz. Government Acquisition Cost $380.00. Shpg. wt. 55 lbs. Dimensions 16"x10"x7". F.O.B. Chicago **35.00**

ITEM #90—Type P-1, rated 200 Amps.—28 Volts. 2500 RPM. Mfd. by General Electric, Ford, Delco-Remy and Westinghouse. Gov't. Acq. Cost $300.00. Shpg. wt. 55 lbs. Dimensions 15"x9"x6". F.O.B. Chicago..... **22.50**

ORDER DIRECT FROM AD
SATISFACTION GUARANTEED
SEND PAYMENT OR PURCHASE ORDER TODAY

TO PLACE PHONE ORDERS CALL WEbster 9-3793

GROBAN SUPPLY CO. Dept PS-4
1139 S. WABASH AVE., CHICAGO 5, ILL.

No Sanding! No Finishing!

Bruce PREFINISHED Oak Floors

BLOCK, STRIP OR RANCH PLANK – Now it's easy and economical to give your home the new beauty of modern oak floors . . . with all the glamour of nationally-famous Bruce Prefinished Hardwood! In only a few hours, your living room, bedroom, dining room—or that unfinished room upstairs—will glow with a style as modern as tomorrow. You can choose Block, Strip or Ranch Plank design.

It's EASY! These floors are completely finished—even waxed—at the factory. Just cover old floor or smooth subflooring with felt paper and nail down this highest quality oak (or install in mastic over concrete). No sanding or finishing . . . no mess or smell. Ready for use as soon as it's laid . . . and your home will have the rich style and beauty chosen by leading decorators.

It's ECONOMICAL! A new Bruce Hardwood Floor will cost you less than a good rug or carpet . . . and will last the life of your home. The famed Bruce "Scratch Test" proves this durable finish doesn't scratch, chip or mar. Ask your lumber dealer for an estimate. Mail coupon below for colorful literature.

MAIL FOR FREE LITERATURE

E. L. Bruce Co., Box 397-M, Memphis 1, Tenn.
Send me complete, free information on prefinished Bruce Hardwood Floors.

Name.....

Address.....

City..... State.....

BRUCE **Bruce Hardwood Floors**

Product world's largest hardwood flooring maker

Supercharger Hops Up '54 Kaiser
[*Continued from page 126*]

in the century, perhaps most notably on the Auburn, Graham-Paige and Cord.

The blower is a pump, plain but not so simple. These pumps are of two types, the Roots, with interlocking rotors (engineers call it the positive-displacement type); and the centrifugal, which throws air off the circumference of a wheel to build up velocity, and therefore volume and pressure.

Neither kind has completely filled the bill for automobiles except, perhaps, for racing cars going at consistently high speed. The Roots type gets out of kilter easily and eats up too much power from the engine. The directly geared centrifugal type has been little good at the lower engine speeds where a motorist does most of his driving. That's because centrifugal force increases as the square of the speed. Too high a blower speed, with too much resulting pressure, causes "ping" or detonation. So the gear ratio between engine and blower on this kind of supercharger has been kept low. That penalized engine performance at low r.p.m. because the blower didn't pump enough air to be effective.

Midget-Car Builder Comes on Scene

All this *was* true. Then along came a fellow named Robert P. McCulloch who, years before, had made a name for himself by building and racing midget cars. He proceeded to make a better supercharger for the ordinary auto engine.

The McCulloch supercharger is different. In fact, at first glance it's cockeyed. McCulloch did away with the complicated gear train that customarily connected the engine crankshaft and the blower. He didn't like gears. They whined. They developed lash.

In their place he put a belt-and-pulley system, plus a sort of planetary-gear system to boost the ratio between crankshaft and blower.

The cockeyed part is that the belt-and-pulley arrangement manages to

[*Continued on page 274*]

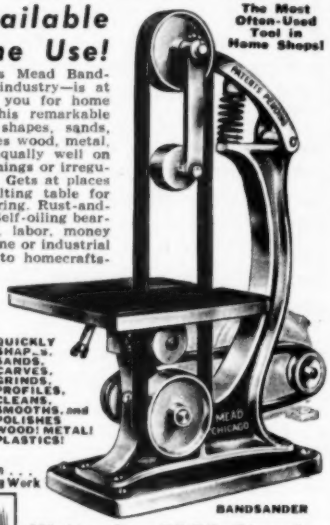
NEW TOOL READY!

Industry's Handy, All'Round Machine

Now Available For Home Use!

The world-famous Mead Bandsander—used by industry—is at last available to you for home workshop use! This remarkable machine quickly shapes, sands, carves and polishes wood, metal, plastics! Works equally well on **inside** cutout openings or irregular outside edges. Gets at places no other can! Tilting table for bevelling, chamfering. Rust-and-sweat proof top. Self-oiling bearings. Saves time, labor, money on jobs in any home or industrial shop. **Invaluable** to homecraftsmen, makers of patterns, tools, dies, signs, costume jewelry, castings, forgings, ornaments, radio and electrical parts, stampings, etc. Nothing else like it. Sold on 5 Day Trial, money back guarantee. Circular Free!

The Most Often-Used Tool in Home Shops!



QUICKLY SHAPES, SANDS, CARVES, GRINDS, PROFILES, CLEANS, SMOOTHS, and POLISHES WOOD! METAL! PLASTICS!

BANDSANDER

Cuts Fast and Clean . . . Saves Filing, Sanding Work

Write for FREE Circular

Send for free details on "the machine that amazed the experts!" Rush a postcard today for Circular, surprisingly low price!

MEAD SPECIALTIES CO.
4114 N. Knox Ave., Dept. B-24, Chicago 41, Ill.

FREE BOOKLET

Your Guide to Speedy Accurate LEVELING

Send for your free copy of "ON THE LEVEL," a booklet that tells you how to handle every type of leveling job speedily, easily, accurately and economically with the new, amazing LEVELALL.

Learn how LEVELALL operates on the principle that "water seeks its own level." . . . how you can level points all alone . . . how easy it is to handle and use the transparent plastic tube, shut-off valves and mounting brackets . . . why LEVELALL is better and quicker than a transit . . . how LEVELALL pays for itself quickly by saving time and costs . . . and how satisfied customers praise this precision instrument.

Send for the booklet and get the facts . . . then you'll want a Deluxe LEVELALL . . . only $12.95. Better yet, take advantage of our money-back guarantee and order your LEVELALL now. Dealer inquiries welcome.

L E V E L A L L

LEVELALL, 81-D Webster St., Rockland, Mass.

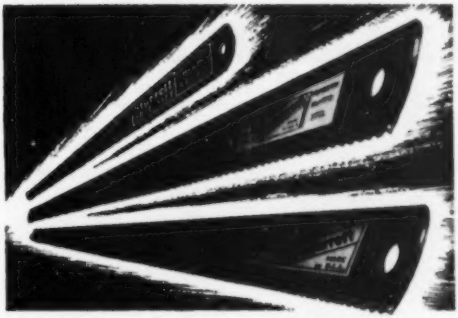
☐Please send free booklet, "On the Level." ☐Mail me Deluxe LEVELALL @ $12.95 ☐Regular 50' model at $9.95 ☐Ship postpaid full price enclosed. ☐Ship C.O.D.

Name_____

Street_____

City_____Zone_____State_____

[In Canada, prices slightly higher; write LEVELALL, INC., 5465 Decarie Blvd., Montreal, Que.]



Precision Made

Starrett®

HACKSAWS

Starrett Hacksaws are made with the same careful workmanship you always associate with Starrett Tools. Made in all sizes for cutting metals by hand or hacksaw machine including shatter-proof SAFE-FLEX® High Speed Welded Edge Power Hacksaws and unbreakable SAFE-FLEX® High Speed Steel Hand Hacksaw Blades.

NO. 249 SCREW SLOTTING BLADES

A real time-saver for hand slotting new or replacement screws. Set of four cuts .049", .065", .083" and .109" slots.

FREE STARRETT CATALOG FEATURING NEW TOOLS

THE L. S. STARRETT COMPANY
Dept. PS, Athol, Mass., U. S. A.

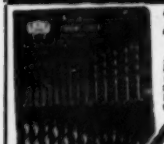
Please send Catalog 26A containing *New Tools* section plus 300 page display of the complete line of Starrett precision tools, dial indicators, steel tapes, hacksaws, band saws, band knives and precision ground flat stock.

Name.....Position.....

Address.....

City.....Zone....State.....

COMPLETE TOOL SETS
AT THE PRICE OF A SINGLE TOOL!!!



29 PIECE SET TURNED DOWN SHANK SPEED DRILLS $11.95

Hi-Test Chrome specially made for SPEED DRILLING

A $32.95 VALUE! Finest Vanadium chrome alloy steel drills hardened and precision ground to the sharpest, longest-lasting cutting edge obtainable; will easily and cleanly bite through hardwoods, plastics, aluminum, iron, and the toughest steels. **Unconditionally guaranteed** for thousands of drillings. Shanks are full jobber-length, turned down in the larger diameters so that all sizes fit into ½" electric drills. Sized by 64ths from 1/16" to ½", packed in a sturdy plastic tool roll with individual pockets. This supreme quality set was originally designed to sell for $32.95. Manufacturer's distress has forced close-out of remaining stock at a tremendous sacrifice. When this lot is sold, drills of this quality will never again be offered at anywhere near this unheard of low price. **ORDER NOW WHILE SUPPLY LASTS!!**

Absolutely no reorders!! Complete 29 pc. Drill Set—$11.95 *postpaid*

There are also available a very few 16 pc. Sets similar to above 1/16" to ½" by 32nds. **$5.95** *postpaid*

Electric Drill CHUCK CONVERTER

Instantly adapt your ¼" Drill to ½" Capacity

Makes your 1 drill do the work of 2. Many more jobs without the expense of an extra drill. Ideal for the home, shop or the factory. Equally useful on hand or electric tools, flexible shafts, etc. Attaches or detaches in a jiffy. COMPLETE—**$1.69** *postpaid*

8 Piece De Luxe Socket Butt Chisel Set

Drop-forged chisels of highest quality tempered and hardened tool steel, beveled and highly polished. Hardwood, leather-tipped handles. Set contains one each, ½", ⅝", ½", ¾", ⅞", 1", and 1¼" chisel, individually held by two spring clamps, ready for instant use. Beautiful case is of varnished hardwood, dovetail jointed and secured by two brass catches. Measures 11-7/16"x6-9/16"x3¾" closed. COMPLETE SET **$7.50** *postpaid.*

PRECISION MICROMETERS $8.98

Adjustable with ratchet stop and lock nut; decimal equivalents of fractional sizes diesunk on frame which is recessed for readings in tight spots. Packed in velvet lined case. 0-1", 1/1000 Readings **$8.98** *postpaid.* 1-2", 1/1000 Readings with 1" test gauge **$11.98** *pp.* 0-1", 1/10,000 Readings **$11.98** *pp.* 1-2" 1/10,000 Readings with 1" test gauge **$14.98** *pp.*

200 PC. ACCESSORY KIT FOR ALL POWER TOOLS

a $7.95 Value for ONLY $2

NOW, EVERYTHING YOU CAN POSSIBLY NEED FOR EVERY JOB OF GRINDING, POLISHING, BUFFING SANDING, DRILLING, SAWING . . .

200 useful accessories right at your fingertips. There is more value crowded into this set of quality items than we have ever before been able to offer!! If bought separately these pieces would cost many times as much! Every piece is quality tested and guaranteed to perform the job for which it was designed. We have searched all over the world to bring you this outstanding accessory value.

The complete kit contains—Circular Saws with Mandrels; Mounted Stones; Burrs; Bristle Brushes; Honing Stones; Unmounted Grinding, Rubber, Cut-off and Felt Wheels and Cylinders; Cloth and Paper Sanding Discs; Twist Drills; 2 Mandrels to accommodate the unmounted items. Maximum Shank diameter of this kit is ⅛".

Complete 200 pc. Kit—**$2** *postpaid*

SET OF 4 SANDER DRUMS AND SLEEVES

For smoothing curved surfaces and edges and hard to reach inside corners. Set contains Drums and Matching Sleeves in the following sizes:

½" x ½"—3/32" Shank
¾" x ½"—3/32" Shank
1⅛" x ½"—3/32" Shank
¾" x 1½"—3/32" Shank

Complete Kit—**$1.69** *postpaid*

SET OF 4 CIRCULAR SAWS AND MANDRELS

Multipurpose saws of 1000 uses. Complete set contains:

½" Saw with ⅛" Shank Mandrel
¾" Saw with ⅛" Shank Mandrel
1½" Saw with ⅛" Shank Mandrel
1½" Saw with ⅛" Shank Mandrel

Complete Saw Set—**$2.50** *postpaid*

CARBIDE-TIPPED MASONRY DRILLS WITH TURNED DOWN SHANKS

The king of stone drills with keen, hardened cutting edges to bite through cement, brick, stone, and the hardest granite. Carbide tip makes drilling easy either by hand or power. Turned down shanks fit all ½" electric drill chucks. Set contains a ¼", ⅜" and ½" drill individually packed and unconditionally guaranteed.

3 pc. Set—Value $7.95 **NOW $4.95** *postpaid*

MONEY BACK IF YOU DON'T AGREE THESE ARE THE BEST TOOL VALUES EVER!

Send Check, Cash, or Money Order . . . C.O.D. Charges Extra

SCOTT-MITCHELL HOUSE, INC.
DEPT. OX-118 611 BROADWAY, NEW YORK 12, N. Y.

Supercharger Hops Up '54 Kaiser

[*Continued from page 272*]

"shift gears," thereby changing the crankshaft-blower ratio, and the planetary-gear system, stepping up the ratio, has no gears in it at all.

The engine gets adequate extra air at both low and high speeds. The belt and pulley "shift" to change the ratio for the blower automatically when the engine demands more air—whatever the engine speed. The unit is quiet. It doesn't sap the engine of horsepower. Top cost in gas is about a half-mile per gallon.

There are drawbacks and questions on superchargers. Nobody knows yet whether the added work given an engine in day-to-day, stop-and-go driving will tend to shorten its life. The use of premium fuel is a must. Compressing the air creates heat. That costs some fuel. But in winter it hastens your warmup.

(For other pros and cons on supercharging, see "Blower Adds Zip to the Family Car," PSM, Aug. '51, p. 134.)

Kaiser is also going to change the rear-axle ratio of its new car—the old ratio of 3.31-to-1 sacrificed performance for better gas economy.

Kaiser Wins a Customer

And Kaiser, like most everybody else these days, offers power steering and an automatic drive.

I am one of those guys who pick up oddments of information on everything imaginable from taxi drivers. The other day, riding uptown behind a talkative hackie, I mentioned automobiles,

"I got to get myself a new car," he said to himself like a Hamlet.

"What are you driving now?" I asked.

"A beat-up old Kaiser. And brother, is she beat up! You know what?—I got 75,000 miles on that job. You know what?—I've spent exactly $150 on repairs, just $150. You know what?—I'm going to get me another Kaiser with this here new supercharger." END

NEXT MONTH* Popular Science *will tell you how to leave home and like it: tips on ways to get more for your vacation money.

BUILD YOUR OWN POWER TOOLS - WITH GIL-BILT PARTS KITS

PLANS only $1.00 EACH POSTPAID

Exclusive GIL-BILT Build-It-Yourself Features

- No machining—build easily with hand tools only
- No blueprint reading — step-by-step pictorial plans, full scale patterns, actual photographs
- Sturdy wood, aluminum and steel construction
- Capacity and performance of commercial saws selling for $60 and up
- Proved performance. Nationally advertised and sold for 7 years. Satisfied customers around the world.

GIL-BILT 10-in. TILT/ARBOR SAW

- 27x28 in. table, 13½ in. capacity in front of blade
- 10 in. blade cuts 3¼ in. deep, tilts full 45 degrees
- Floor model 34" high, table always stays level
- New Departure ball bearing arbor, ¾" precision shaft turned down for ⅝" bore blades, alum. housing, shipped ready to run.
- Jackscrew and 4½ in. dia. handwheel lowers and raises blade
- Cast aluminum miter gauge and self-aligning rip fence guide

GIL-BILT Metal Parts Kit includes Plans, ball bearing arbor, miter gauge and bar, rip fence guide, dado insert, lock knobs, jackscrew mechanism and handwheel, and all other metal parts (less blade) $22.95
Same Kit with 10" Combination Blade $25.90
Same Kit with 8" Combination Blade $24.90

GIL-BILT 12-INCH BAND SAW

- Cuts to center of 24 inch circle
- Handles stock up to 6 inches thick
- 18x18 inch table tilts 45 degrees
- Lower wheel and drive pulley runs on sealed New Departure Ball Bearings; Upper wheel runs on two ⅝" bore Oilite Bronze bearings
- Upper wheel tension and tilt mechanism of cast aluminum, completely assembled
- Upper and lower blade guides. Each has ball thrust bearing, self-lub bronze jaws
- Rigid cast aluminum wheels fully machined ready-to-install. Heavy rubber tires
- Uses standard 28 inch blades up to ¾ in. wide
- Fully enclosed mechanism for utmost safety

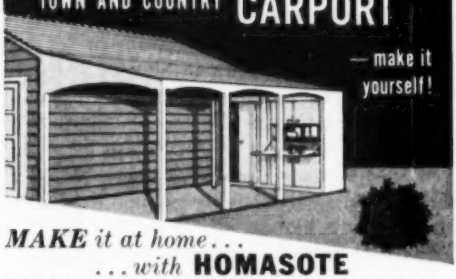
GIL-BILT Metal Parts Kit includes Plans, rubber tires, aluminum wheels, ½ in. blade, ball bearing spindle, tilt mechanism, blade guides, table tilt segments, and all other metal parts $23.95

ALSO AVAILABLE Plans & Parts Kits for 18-in. Band Saw, Belt Sander, Spindle Shaper, 8-in. Tilt-Table Saw

Return Kits in 10 days for refund if not satisfied. *For shipments up to 600 miles add 5%, over 600 add 10%. Amount in excess of actual postage will be refunded.* Order Kit now, or order Plans at $1.00 each and Kit later less cost of plans. Write for **FREE** Catalog.

GILLIOM POWER TOOLS P. O. Box 1-VD, Lambert Field St. Louis 21, Missouri

An important addition to your home . . . the TOWN AND COUNTRY CARPORT — make it yourself!



MAKE it at home . . . . . . *with* HOMASOTE

This basic design offers many possibilities . . . for an extra porch, a covered terrace, framing for another room — or, as designed, a carport with tool shed, potting bench and storage compartments. The plan adapts to meet your needs. *You build without blueprints!* Our simplified Easi-Bild* Pattern #273 specifies all materials required, shows you how to cut each piece to exact size, how to finish the job professionally.

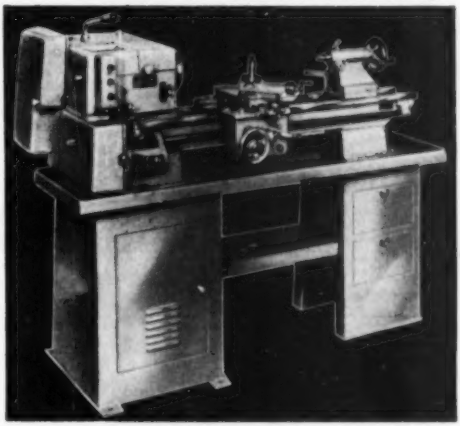
The major material used is 15/32" Homasote — the oldest and strongest insulating-building board on the market. *Completely weatherproof, permanently crackproof,* Homasote saws and nails easier than wood, takes any paint or stain. Homasote is distributed by building materials dealers throughout the United States and in Canada. Send coupon today for pattern and Homasote literature.

*T. M. Reg. Easi-Bild Pattern Company

HOMASOTE CO., Dept. 41, Trenton 3, N. J.
I enclose $1.00 for which send me Pattern #273.
NAME .....
ADDRESS .....
CITY ..... STATE .....
My lumber dealer is .....

biggest PLUS *in lathe history!*

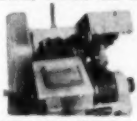
NEW 5300 12" CLAUSING (1" COLLET CAPACITY)



"ZERO-PRECISION" TIMKEN TAPERED ROLLER BEARINGS, AND EXCLUSIVE FRICTION CLUTCH AND BRAKE COUNTERSHAFT = GREATER ACCURACY . . . TOP PRODUCTION

ZERO-PRECISION BEARINGS
Precision ground, forged steel spindle turns on widely spaced heavy duty Timken "Zero-Precision" tapered roller bearings — bearing run-out tolerance is .00015.

MASSIVE TAILSTOCK
Heavy duty tailstock, No. 3MT ram with tang socket. Swing-type wrench, permanently attached, controls bed lock.



CLUTCH AND BRAKE
Friction clutch-brake that permits instant starts and stops of spindle without stopping motor. Belts are fully guarded.

WRITE FOR LITERATURE —TODAY!

The brilliant new CLAUSING 5300 Series Lathe gives you more *Plus Value* features than have ever before been available in any lathe...at or near its price!

Husky Timken "Zero-Precision" tapered roller spindle bearings. Forged steel spindle with hardened ground nose. 1" collet capacity. Heavy duty tailstock with No. 3 MT ram, tang socket. Built-in countershaft with friction clutch and brake. Double-walled automatic apron with oil bath lubrication. 12 speeds, 29 to 1300 RPM. Instant selection 48 threads or feeds. Steel-cable B-belt drive. Massive bed, 7⅜" wide, 5⅛" deep . . . V-ways and flat ways precision ground. New heavy steel plate pedestal base and pedestal cabinet.

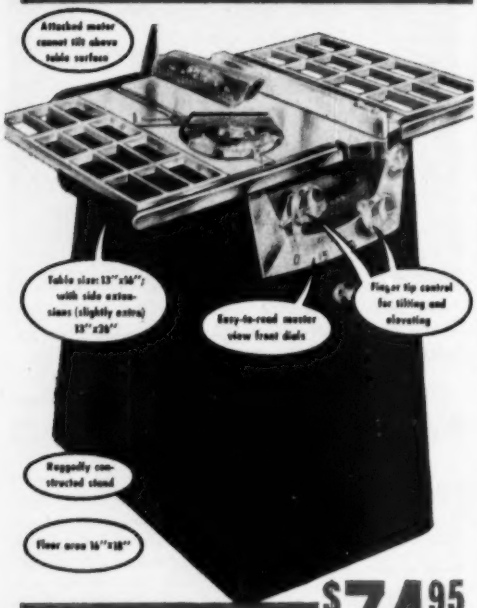
These are but a few of the many features that make the new CLAUSING 5300 the biggest PLUS value in lathe history. See them all at your Clausing dealer's!

PRICES START AT **$715.00** F.O.B. FACTORY

Atlas CLAUSING

CLAUSING DIVISION
Atlas Press Company
4-136 N. PITCHER ST., KALAMAZOO, MICHIGAN

SAVE $25.00 on
Shopmaster SPECIAL FOR HARDWARE WEEK
PLUG IN
Floor Model TILTING ARBOR SAW
Including Attached 1/2 HORSEPOWER MOTOR



$99.95 Value Specially Priced at $74.95
A $25.00 Saving During Hardware Week, April 16-24

SHOPMASTER scores again! First with a ready-to-use . . . ready to plug in Floor Model Tilting Arbor Saw. It's ideal for your home shop. Take it home . . . plug it in . . . and start sawing.

It's a precision tool, simple enough for even the beginner, yet accurate and efficient enough for the professional hobbyist.

Every feature of the new SHOPMASTER Floor Model Tilting Arbor Saw is designed for easier operation. Attractive, easy to read master view controls provide unusual accuracy, eliminates guesswork. Novel transparent plastic guard gives 100% visibility for precision cutting. Cuts up to 2½", tilts to 45° has ½" arbor. Sealed for life ball bearings. Special motor mounting provides easy rail adjustment even when motor is at 45°. ½ H.P. 1725 standard speed attached motor is included in price.

MAIL COUPON FOR FREE CATALOG

SHOPMASTER, INC. Rm. 11J
1214 South 3rd St., Minneapolis, Minn.
Please send me a free catalog.
Name _____
Address _____
City _____ State _____

An Atomic Locomotive Could Be Built

[*Continued from page 140*]

start, as the intense radioactivity makes it virtually impossible.

Is there enough in favor of A-locomotives to offset their complexity and obvious costliness? "The only real incentive for atomic power," says Dr. Borst, "comes from a possible reduction in fuel costs." And here is the score on that point, as he sees it:

An atomic locomotive must be used in heavy-duty service, where its power is fully utilized, to give the highest "equivalent uranium price." To rival a diesel, in a type of service using it only 200 hours monthly, an A-locomotive would have to burn uranium 235 costing no more than $3,000 a pound. But if used 400 hours a month, it could burn $11,000-a-pound uranium 235 and compete with a diesel. And that includes the annual "amortization" charge to repay an investment of $1,200,000 for an atomic X-12, against little more than half as much for a comparable four-unit diesel.

Unofficial Estimate: $9,000 Per Pound

Now, while the AEC isn't telling the cost of producing uranium 235 in its plants at Oak Ridge and elsewhere, it has made enough data public for scientists to arrive at an unofficial estimate. Their calculations indicate the figure to be around $9,000 a pound.

If that figure is anywhere near correct, there seems a reasonable chance that an atom burner like the X-12 will be built. And any future improvements in the AEC production line, lowering the cost of U 235, should make the chances that much better. END

No Argument

THE minister was trying to get an appropriation of $200 for a new chandelier. One man on the church council refused his consent.

"Just why, Henry, do you disapprove?" asked the pastor.

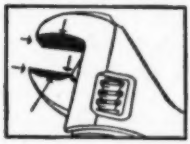
"For two reasons," said Henry. "First, $200 is too much money, and, second, I don't believe there's anyone in our whole congregation that can play a chandelier."—*Northwestern Bell.*

LOOK FOR THE NAME

UTICA®

ADJUSTABLE WRENCHES THAT LAST UP TO 10 TIMES LONGER

Ordinary adjustable wrenches, subject to hard usage, burr over at the jaw edges. UTICA® wrenches have jaw surfaces extra-hardened by electronic induction (see diagram at left). Tests show they last up to 10 times as long as ordinary adjustable wrenches.



Jaw surfaces induction hardened for longer wear.

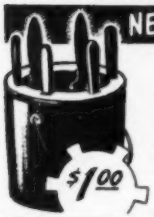
Your hardware dealer has UTICA® *adjustable wrenches or can get them for you. Sizes 4" to 18".*

UTICA

DROP FORGE & TOOL CORP.
Utica 4, N. Y.
JOBS AVAILABLE FOR TECHNICALLY TRAINED PERSONNEL

A MUST! Every Home Should Have One
Full satisfaction or money refunded • Patented

NEW! PAINT BRUSH HOLDER



KEEPS BRUSHES LIKE NEW

Holds SIX brushes (1" to 4") suspended in your favorite brush solution, ready for instant use. Bristles stay straight, no curling. Cover keeps out dust, stops evaporation. Fits any standard gallon paint can. Send $1.00 only for each holder desired. Send check or cash. We pay postage.

THE COMFORT PAINT BRUSH HOLDER CO.
P.O. Box 6286 St. Petersburg 6, Fla.

Weekend Carpenters

Add a professional finish to your jobs with Plastic Wood — the wood filler most carpenters use. Easy to apply ... handles like putty, hardens into real wood.

YOU NEED "PLASTIC WOOD"®

See what you're doing. Miti-Mite Magnifier adjusts to exactly the right position.

Light where you need it! Handi-Lites attach instantly to any round or flat ferrous surface.

You'll save time & trouble in hundreds of ways with

LUFKIN MITI-MITE Magnetic BASE TOOLS

Magnetic base Handi-Lites in two sizes . . . magnetic base Indicator Holders in two sizes . . . magnetic base Magnifiers . . . Portable De-magnetizers.

No more haphazard clamping! You get quick accuracy with the Miti-Mite Indicator Holder.

As good as an extra hand! Miti-Mite magnetic base tools save time and temper.

BUY LUFKIN TAPES—RULES—PRECISION TOOLS AT YOUR HARDWARE OR TOOL STORE

Send for Free Booklet

LUFKIN RULE CO., Dept. PS, Saginaw, Michigan

Please send me your free booklet describing Miti-Mite magnetic tools.

297

NAME _____

ADDRESS _____

CITY _____ STATE _____

Use These 3 Simple Steps to Get Expert Paint Jobs!

Step 1. *Prepare surface.* Remove all chipped and peeling paint or varnish down to bare wood. Do this by "flowing on" deep-cutting Strypeeze . . . stays wet longer, clings to upright surfaces. Clean off with scraper or #3 steel wool. Won't sting hands. Contains no benzol.

Step 2. *Rebuild broken corners, fill nicks and holes* with Savogran Wood Putty, a powder-form real wood filler. You can form it, tool it . . . and it doesn't shrink. (For cracks in plaster, use Savogran Crack Filler. It's the original patented quick-hardening water putty.)

Step 3. *Start job with clean brushes.* Clean old brushes before painting. Clean all brushes after painting and whenever you change colors. Savogran Kwikeeze, the Liquid Brush Cleaner, softens *hard* brushes in minutes . . . cleans out fresh paint instantly! An excellent deglosser. May be reused.

Whenever you're painting, you need

SAVOGRAN

REG. U. S. PAT. OFF.

PRODUCTS . . . at better paint & hardware stores

Write for free helpful literature

SAVOGRAN CO., Dept. 46, 25 Huntington Ave., Boston 16, Mass.

He Shifts Gears with Faucets

[*Continued from page 146*]

him. At least he silenced me with a gesture and went on to sketch out the sequence on pages 144 and 145.

With this feedback rig, Banning explains, you get a husky, smooth torque multiplication that can be accurately controlled by the hand valves.

Banning firmly believes that the future of this kind of power application is tremendous. Certainly a lot of military and industrial experts are coming to his unimpressive shop in Zilwaukee. He flatly states that he is in no way interested in producing any form of automobile, and that the sports car he built was made just for fun.

Banning vs. Detroit

To me, the Jeep that he is piloting around Zilwaukee now is the most interesting development of all. Here are no electrical complexities. Banning built this job purely to test out the hydraulic aspects of his idea—to see if his positive-displacement pumps and motors could outperform Detroit's blade-and-impeller converters.

The Jeep is a cadaverous and rather outrageous vehicle. The original engine and transmission are gone. The drive shaft has been sawed off amidships and a chain sprocket welded to the stub end. A motorcycle chain hooks it to another sprocket that protrudes from a big metal box mounted where the rear seat of the Jeep once was.

This metal box looks like a covered minnow tank, with half a dozen or so faucet handles projecting through the lid. The drive shaft from a little air-cooled Kohler engine enters the rear of this tank—and pure, unadulterated torque comes out the other end.

Banning controls this odd craft by twisting a valve now and then. Every time he turned a faucet the Jeep gave me another lusty boot in the back and surged ahead. Engine speed remained constant except when it occasionally slowed because of a stuck carburetor

[*Continued on page 280*]

CARPENTERS, HOME CRAFTSMEN . . .

make nail pulling easy —

CAT'S PAW NAIL PULLER

does the job faster, better!

IF YOU USE A HAMMER YOU'LL WANT A CAT'S PAW NAIL PULLER

The new CAT'S PAW Nail Puller is indispensable to Home Craftsmen, Carpenters, Builders. It removes nails easily and with a minimum of damage to wood. Spoon-shaped head gets under nailheads cleanly.

Also Available

Large size 24" x 3/4" Wrecking Bar with exclusive CAT'S PAW CLAW — $2.50 Delivered in U.S.A.

Black, with polished head.

Tough, rusty nails, up to 20-penny size, withdrawn with ease . . . the CAT'S PAW specially designed contour head gives leverage where it's needed. DREWMALLOY — a tough-treat process — gives rugged strength. CAT'S PAW Nail Puller is enthusiastically endorsed by thousands of satisfied customers!

$3.00 SPECIAL OFFER

For set of both styles 277H, 15" long 277B, 10½" long, 5/8" hex. Tempered DREWMALLOY Steel. Delivered price $3.00, anywhere in U.S.A. only.

Order your set today, at special mail order price. SEE YOUR DEALER OR ORDER DIRECT

C. DREW & CO. KINGSTON, MASS.

PRECISION PLIERS

• *For accurate, exacting work use the fine, small pliers jewelers and watchmakers use — Kraeuter's Precision Pliers. Matched in size and handle shape, drop forged from selected tool steel, machined and heat treated to exacting specifications. For hobby crafters, model builders, TV and radio technicians.*

Buy wherever fine tools are sold in U. S. and Canada.

KRAEUTER

How to maintain floors

Clean, sparkling wood floors are simple to have and hold. Free book tells how. Easy step-by-step pictures explain. Send coupon now for Free copy. Limited printing so write today.

FREE

MAIL THIS HANDY COUPON RIGHT AWAY

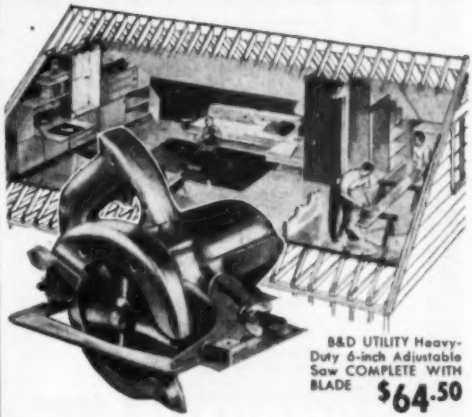
Red Devil Tools, Irvington 11, N. J.
Please send Booklet HT-105

NAME_____

ADDRESS_____

CITY_____ STATE_____

Look what you can do with this New Black & Decker Saw!



B&D UTILITY Heavy-Duty 6-inch Adjustable Saw COMPLETE WITH BLADE **$64.50**

This new B&D Utility Saw makes angle cuts, bevel cuts, dadoes—every cut you need to add a beautiful room to your home, or make a bookcase, furniture, cabinets, etc. What's more, work goes 10 times faster and easier, thanks to these Black & Decker features: B&D-built motor gives extra power in tough spots. Built-in adjustments permit 2" depth of cut at 90°, 1⅝" at 45°. Saw-grip handle at natural sawing angle plus king-size bottom plate give better balance. Try this new saw at your Utility dealer's today!

Try it yourself and get a chance to win $1,000.00

Visit your nearby Utility dealer for a demonstration of this new saw. Then fill out a free entry blank, describing the features you like best—and you may win $1000 in Black & Decker's big Saw Contest.

Bob Davis says: Send 25c for my "Handy Tips" booklet, full of home repair ideas plus information on Easi-Bild* patterns for a wide variety of home projects. Address: Bob Davis, Home Service Dept. H4S, The Black & Decker Mfg. Co., Towson 4, Md. *T.M. Reg. Easi-Bild Pattern Co.

Black & Decker UTILITY

PORTABLE ELECTRIC TOOLS

Science Speeds Shaving With "Canned Lather"!

That's right! They've invented a gadget that makes shaving faster, easier, more pleasurable! Now you can get rich, creamy lather right out of a can . . . ready to use!

No brush to slow you down . . . no greasy cream to clog your razor. Just push valve . . . out comes lather! That's AERO SHAVE . . . the wonderful new "canned lather" that contains 3 beard-softeners to wilt toughest whiskers in a jiffy . . . *plus soothing lanolin to protect your skin against shaving irritation.*

Get AERO SHAVE Lather Bomb today . . . in the handy metal container with the turret top that won't leak when you travel.

Big Bargain! Aero Shave is the lowest priced "push-button" lather bomb on the market today!

USE "PUSH-BUTTON" LATHER

AERO SHAVE

Also economical King Size—12 oz. only 98¢

WEEK-END DECORATORS!

Peel off old paint

FOR A BETTER JOB

Why try to paint over a cracked, checked or broken finish . . . when it's so easy to "peel it off" with Klean-Strip? This modern remover leaves the surface clean, smooth and dry — ready for a better, longer-lasting paint job. Non-inflammable Klean-Strip works fast on all type finishes. Needs no afterwash or neutralizing . . . saves labor and materials. Buy it when and where you buy paint.

Made by The Klean-Strip Co., Inc.

2340 S. Lauderdale, Memphis 6, Tenn.

KLEAN-STRIP IS A 'HARDWARE WEEK' VALUE

He Shifts Gears with Faucets

[*Continued from page 278*]

float valve. With a genius' fine disdain for details, Banning would then whack the float bowl with a wrench and our tour would continue. You forgot how ludicrous the Jeep looked when you discovered how much beef it had.

From Banning's view, the cockeyed look of the Jeep isn't important. The tank is big because it gives Banning and his men room to get their elbows and wrenches in to make quick changes in the hydraulic gear. The chain drive is just a convenient way of getting power down to the shaft.

As with the Polade Power electric motors, the Jeep works on the principle of torque reaction led back and applied to the load. In this case, though, with no electricity involved, Banning does it differently.

The Wonder "Go-Boxes"

The input shaft from the engine drives a ring gear, much as in an ordinary auto differential. Reaction is transferred to little pinion gears that are coupled to hydraulic pumps. The oil pressure these pumps develop is fed to hydraulic motors linked to the output shaft. The whole lash-up, as I saw it, takes the engine's 44 pound-feet of torque and brutes it up to a potent 240 at stall. This multiplication is entirely without reference to the Jeep's axle ratio or the chain drive.

Even though the idea still seems to me, at times, like a bootstrap deal, Banning is negotiating with some reputable companies for the sale of manufacturing rights. When you ask him about high-torque transmissions for cars, he says he's interested only in licensing manufacturers. But he's sure that some wonder go-boxes are coming. END

Modern Bargain

SHE heard that modern appliances would cut her work in half—so she bought two of each. —*Hudson Newsletter.*

Buy EVANS for

EXTRAS

in 6, 8, 10 and New 12 Foot

"WHITE-TAPES"

FROM **98¢**

FREE WITH EVERY TAPE
— this sparkling crystal Tenite utility case

This is the BUY for your money — the original, reasonably priced "White-Tape" by EVANS. Your measuring tape dollar goes further! Chrome plated, sturdy case. Snow-white Bonderized steel blades with jet markings, easy to read, last longer. Velvet push-pull action. Instant change replacement blades available. 12-foot size, made *only* by EVANS, has convenient new blade markings in feet and inches as well as regulation inches.

EVANS
L-O-N-G "WHITE-TAPES"

25-50-75-100 Ft. Lengths. Sensibly priced from $3.49. In transparent utility box. Leather grained vinyl cover. Hook ring attachment no extra charge.

Sold Only Through Retailers

Evans & CO. 410 Trumbull St., Elizabeth, N. J.

EVANS, THE LARGEST PRODUCERS OF STEEL TAPES WORLD-OVER

BUILD IT

FIX IT with AMBROID

- Ready-to-use
- Fast drying
- High tensile strength
- Transparent
- Waterproof

IT STAYS STUCK

Dries entirely by evaporation of the solvent. Quick setting—no distortion. Ideal for assembling, repairing, home crafts, electrical work, factory, workshop or household use. Send postcard for free literature.

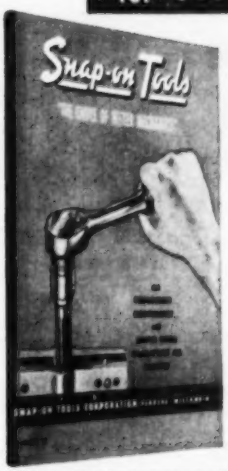
Try Ambroid in your business, too. For over 40 years recognized as the leading industrial adhesive of its type.

Art galleries, museums, and leading industrial concerns, rely on AMBROID

TRY A TUBE TODAY—At most hardware stores and hobby shops. If your dealer cannot supply you, send 30c for big 2 oz. tube, postpaid. Money back guarantee.

AMBROID 306 FRANKLIN ST. BOSTON 10, MASS.

send for FREE CATALOG



America's Foremost *money-making* **MECHANICS' TOOLS**

It's easy to own the same "pay-off" tools used and endorsed by America's top-earning mechanics throughout the automotive, aviation and industrial fields! Snap-on tools help you handle every repair job faster, easier, better. And they LAST . . . pay for themselves over and over again! Start building your own tool set now with basic Snap-on units—add others any time. Genuine Snap-on tools are never sold in stores—direct to users only. Mail coupon for free catalog.

Snap-on Tools
THE CHOICE OF BETTER MECHANICS

Snap-on Tools Corporation
8060-D 28th Ave., Kenosha, Wis.
Send me free catalog. Occupation_____
Name_____
Address_____
City_____ Zone_____ State_____

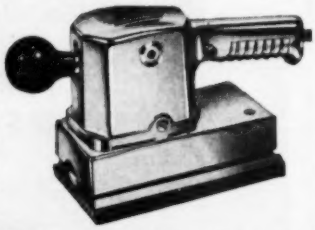
Do it with DREMEL
Straight-Line Action Sanders

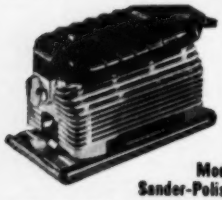
For the finest finish sanding, take a tip from the professional craftsmen—insist on Dremel *Straight-Line Action* Sanders. They save you money when you buy them. They save time, labor, and expense when you use them. And they're guaranteed to produce finer finishes because straight-line action sands with-the-grain—prevents cross-grain scratches and orbital swirls. Hobbyist, jack-of-all-work, or professional—there's a Dremel Sander for your needs.

Of the four common sanding actions, only Dremel sands 100% *with-the-grain* — the only guaranteed scratch-free action approved by finishing experts.

NEW MODEL "53"

This new sander is a real powerhouse, a professional tool at a handyman's price. The first ROTARY MOTOR (AC) sander of its kind to have straight line action. Weighs only 5¼ lbs., has 24 sq. in. sanding pad. Out - performs other makes selling for twice as much. Positively the best heavy - duty sander buy on the market. Complete with 2 detachable sanding pads.... **$34.85**





Model "2000" Sander-Polisher

Perfect for small shop, home use. Features Dremel "Straight - Line Action"; high speed reciprocating motor; 14,400 strokes per min.; wt. 5 lb.; 21 sq. in. sanding surface.

Price includes: Sturdy, steel carrying case, Model "2000" Sander-Polisher, 1 polish pad, 25 asst'd abrasives..... **$24.50**

Model "A" Sander-Polisher-Massager

Three tools in one! Lighter capacity for general-purpose use. Features "Straight-Line Action"; high speed reciprocating motor; Wt. 2½ lbs.; 12 sq. in sanding surface. Complete with 1 polish pad, 1 massage pad, 6 abrasives..... **$14.85**

SEE YOUR DEALER: If he cannot supply, order direct on 5-day trial, money-back guarantee. Remit in full for postpd. shipment; or send $2, pay postman balance plus postage and COD.

DREMEL MFG. CO., Dept. 124-D, Racine, Wis.

NEW! Every Electric Drill A Powerful PORTABLE JIG SAW

"ARCO JIG-SAW"
HAS SAME CAPACITY, CUTS AS FAST AS SAWS COSTING $50 & UP! DOES WORK OF ALL THESE SAWS: JIG, KEY-HOLE, COPING, BAND, RIP, CROSSCUT, HACK-SAW.
HAS EXCLUSIVE, BUILT-IN AIR BLOWER.

At Better Hardware Stores Everywhere

Here for the first time is a Portable Jig Saw that attaches in ONE MINUTE to any ¼" electric drill. It will handle any project from the smallest to the largest, cuts openings without a **starting hole.** Cuts intricate patterns, circles, etc., in wood, wallboard, plastics, metals.

"ARCO JIG SAW" is a powerful, lightweight tool that is easy to handle because of its **Right Angle Drive.** Strong **Safety-Yoke & Worm Drive Clamp** make it a vibration-free unit.

No. 505—Six extra Blades for wood, metals, etc.....**$1.95**

BUY THE BEST—see your hardware dealer now! If not available, try "ARCO JIG-SAW" on our **10-DAY MONEY BACK GUARANTEE.** Send us check or M.O. (Postpaid), C.O.D.'s—postage extra.

ARROW METAL PRODUCTS CO.
Dept. PS-4, 140 WEST BROADWAY, NEW YORK 13, N.Y.

PUMP WATER *FAST!*

DRAIN WASH TUBS, CELLARS, CISTERNS
IRRIGATE—FILL TANKS—DRAW WELL WATER

Pumps 2800 GPH. 420 GPH at 75' High or 1600 GPH from 25' well. Sturdy, Rustproof Alloy Metal. Six Blade Impeller. Uses any 1/8 to 1/2 H P Motor. Will not leak or clog. Fits any garden hose. Immediate Money Back Guarantee. Send Check, M O., or C.O.D. **$6.95** IN U.S.

MOORE MANUFACTURING CO.
SWEDESBORO 2 NEW JERSEY

FREE INFORMATION
Find URANIUM, GOLD, SILVER

and other valuable metals with the latest scientific instruments available. Guaranteed. Free Information. Write TODAY to:

THE DETECTRON CORP., Dept. PS-5
5420 N. Vineland, N. Hollywood, Calif.

Also Eshelman **SPORT CARS**

WORLD'S LOWEST PRICE

70 Miles Per Gal. Holds 1 Adult. Free Literature

ESHELMAN FOR Better LAWNS And GARDENS

RAKES
PLOWS
CULTIVATES
HARROWS
HAULS
SPRAYS
SAWS
DOZER
MOWS
CUTS
ROLLS
TILLS
SNOW PLOW

1 to 8 H.P. Also Walking Tractors Low as **$69**

Women Can Operate It. Free Catalog. Write

ESHELMAN Dept. R-44
119 Light St., Balto. 2, Md.
333 N. Michigan Ave., Chicago-1, Ill.
7070 Hollywood Blvd., Los Angeles 28, Cal.

The QUICK-WAY to SHARPEN CIRCULAR SAWS

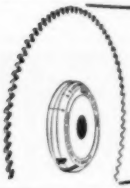
The complete sharpener, featured in FORTUNE and other leading magazines. Anyone can use . . guarantees precise grinding and spacing of teeth. Operates on your own power table. Complete with patented Index Plate, facing block for mitre and $3.00 grinding wheel—no extras needed. Sharpens circular saws up to 12" diameter. Saves time and money.

Send check, cash or money order. We pay postage.

Model 6-12P
$16.50 *Postpaid*

QUICK-WAY Saw Company
13 Riverside Corning, N.Y.

THE HEAD CAN'T FLY OFF! Estwing "Unbreakable" hammers and hatchets are forged in one piece from tough tool steel. Grip is genuine leather, proven most comfortable and durable. Used by the carpenters for 30 years. Ax $4.50, hammer $3.65. At all leading hardware stores. Write for FREE catalog. **ESTWING MFG. CO** Dept. M, Rockford, Ill.



.01" ACCURACY with MAGNA DADO!

Geared hub. Sets in 5 seconds with Allen wrench. Cuts any groove 5/32"-7/8" wide. 2" max. depth. 12-gauge tempered steel blade; 8" dia. Available at SHOPSMITH dealers. Fits most saws, $14.95.

LOOKING FOR THE BEST PLIER TO BUY?

GET

CHAN NEL LOCK

TRADE MARK REG. U. S. PATENT OFFICE

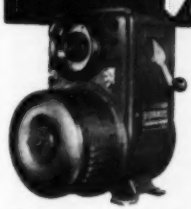
CHAMPION DeARMENT TOOL CO., MEADVILLE, PA.

Easier Metal Repairs

FREE Illustrated Booklet, "Soldering Simplified." 16 pages of how-to-do-it! Get your copy.

Kester Solder Company
4254 Wrightwood Avenue, Chicago 39, Illinois

YOU'LL EARN BIG MONEY with HOBART "Simplified" ARC WELDING



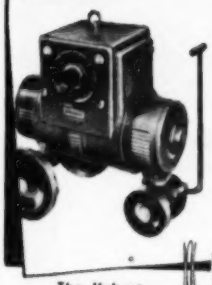
AC Welding and AC Power

Double your earnings doing repair and construction work, away from power lines. "Build Your Own" gives you AC welding—plus electric power for operating tools, lights, etc. Use a gasoline engine, or hook to drive shaft with V belt.

Welds Anywhere!

Air Cooled Portable Engine Drive

With the "Husky Boy" 200 amp. arc welder you can do profitable general shop and outside repair work, emergency service on pickup trucks—all on a low investment. It's compact and lightweight—easy to transport. For extra convenience when used inside, wheels and handles easily bolt to the unit, and are available at slight extra cost.



300 Amp. Electric Portable Arc Welder

Superior performance with true economy should make this welder your choice for 9 out of 10 welding jobs. Remote Control • 1000 Welding Heat Gradations • Oversize 4 Pole Exciter • Sirocco Type Cooling Fan • Vibrationless Steel Shaft • Polarity Control are Hobart features that assure faster, better, low cost welds.

The Hobart Welding School

America's most modern. Every type of training. Equipment latest and best.

You'll like Hobart Electrodes

Hobart's complete line, precision made and rigidly inspected, solves every welding problem.

Hobart Brothers Co., Box P-44, Troy, O.

"One of the world's largest builders of arc welders"

HOBART BROTHERS CO., BOX P-44, Troy, O.

Send complete details on items checked.

☐ Electric Drive ☐ Gas Drive ☐ Generator Only ☐ Air Cooled Gas Drive ☐ Hobart Trade School ☐ Electrodes ☐ Accessories

NAME _____

ADDRESS _____

CITY _____ STATE _____

☐ Check here for your vest pocket welding guide

So easy to Remove Paint

You'll be amazed at how thoroughly Wonder-Paste softens up paint, enamel, varnish, etc. Makes the old finish come off easily—not coat by coat, but all in one scraping. Use indoors or outside — on floors, trim, furniture, etc. Does not run on vertical surfaces. At paint and hardware stores.

Write for Wonder-Paste leaflet—and advice on your removing problem.

Wilson-Imperial Co., 121 Chestnut St., Newark 5, N.J.

WONDER-PASTE

Over 4 million cans sold—it must be good!

Swedish Steel *Chisels*

SHARK BRAND

ESKILSTUNA, SWEDEN

Genuine Swedish Charcoal Steel hardened and tempered for two-thirds of the length of the blade — that's the *big* difference between SHARK BRAND Paring Chisels and the ordinary kind. You'll do *better, faster, more accurate work easier with these finest of all chisels.* They really stay sharp and are honed with an extra wide bevel for the professional carpenter or home workshop enthusiast.

Try one next time you're in a hardware store. Make sure it's SHARK BRAND. Sold singly or in sets with tough Curly Birch or unbreakable plastic handles.

Write for SANDVIK Folder
Dept. B-1

Sandvik Saw & Tool
Division of Sandvik Steel, Inc.
47 WARREN ST., NEW YORK 7, N. Y.

20X Coated Lens TELESCOPE

IN GENUINE PIGSKIN CASE
$7.95 postpaid

Mk. II

Our most universally popular telescope with hunters, sportsmen, boat owners. A superior quality *all metal* instrument, finely finished, rust and salt spray resistant. Fullcoated oversize objective lens, pinpoint extension focusing. A big, powerful scope, a lifetime possession. Shipped in lined and fitted genuine pigskin carrying case. Send check or M.O. ⅓ deposit on C.O.D.'s 10-day money-back guar. Calif. resid. add 3% state tax.

FREE—44 PG. OPTICS CATALOG

Down-to-earth prices on all optics—made to our rigid specs. by the Japanese optical industry. Free on request or with your order.

The AKRON 81 Akron Bldg., 4379 Sunset Blvd. Los Angeles 27, California

SHEET METAL BRAKES

Angles, flanges, Pittsburgh locks, 24 G. steel, heavier aluminum. Cam locking, mount on bench, truck or floor stand. Truss braced-steel. Express collect. 30", 65 lbs., $28.50. 36", 75 lbs., $33.00. 48", 100 lbs., $48.00. Also 8 ft. size. Floor stand, 22 lbs., $7.00. 15", capacity 16 gauge, 40 lbs., $21.50. **IRON BENDER** ¼x3, **$9.50. TUBING BENDER**, ¾"-1", **$6.00. SHEARS** 7 x 16 ga. steel, **$14.00;** 24" squaring and slitting shear, 24 ga. 16 ga. aluminum, **$38.00. Hand Bending Brake,** 14", **$6.50.** P. Paid.

(Immediate delivery. Order cash or C.O.D., or send for folder)

VYKE BRAKE CO., S-2439 15 St., Denver 11, Colo.

SUPER DRILL GRINDER

Sharpens round shank drills from 3/32" to ½" in diameter, up to 6" long. Grinds old drills like new in 4 different point angles, using hand or power grinding wheels. Money-back guarantee, only **$2.95**

At Dealers or Postpaid

A.D.McBURNEY 5908 Hollywood Blvd., Dept. S-40, Hollywood 28, Calif.

SAVE ... MIDDLEMAN'S PROFITS

BUY DIRECT FROM FACTORY! from MASTER MECHANIC'S BIG 1954 Catalog

Hundreds of unique, labor saving tools and devices for shop, farm & home. SEND 10c to:

MASTER MECHANIC Mfg. Co. Dept. CSS Burlington, Wis.

IT'S THE NEW *Flash* "75"

SOLDERING GUN THAT WEIGHS
ONLY 6 OUNCES!

There is nothing else like the Flash "75" for direct operation from 110 V AC or DC line. Heats up quickly. The natural wrist position, perfect balance, cool pistol grip and light weight make a Flash your best buy. Four optional interchangeable tips. REPLACEABLE HEATING ELEMENT—a feature that prolongs life of tool and assures uninterrupted service. **PRICE $2.95.** Ask your dealer or send for literature or a Flash "75" shipped postpaid direct to you.

PHILLIPS MANUFACTURING CO., 2316 Aldrich Av. S., Minneapolis 8, Minn.

SAVE $ $, DRILL OWN WELLS!

Having wells drilled costs *plenty!* Save by buying inexpensive, lightweight—built for years of service—CON-SOL well driller. Get investment back through rental, contracting, resale. Simple to erect, operate, move. Drills wells, deep or shallow, anywhere — *fast* Extra-hard insert needs renewing only after long use.
Fully guaranteed for 90 days against defective materials and workmanship.
Used by U.S. Depts. of Agriculture and Forestry, U.S. Navy.
For 4" casings, $385 F.O.B. factory, includes drill, bailer and 100' cable. Additional cable, up to 300', 3/4 hp motor or 1 1/2 hp gasoline engine, available at extra cost.
HEAVY DUTY MODEL, for 6" casings, available with gasoline engine, at $1295 F.O.B. factory.
Prices and specifications subject to change without notice.

CON-SOL

Write for free literature to Dept. PS-4

CONSOLIDATED INDUSTRIES, INC.
WEST CHESHIRE, CONN., U.S.A.

AT ALL HARDWARE STORES

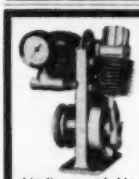
FULLER'S *famous* "FOUR-IN-ONE" Screwdriver

All these blades included:
- No. 2 Recessed for cross head screws;
- 1/4" Diameter for fine work;
- 3/16" for electrical work;
- 1/4" Diameter for regular work;
- heavy aluminum chuck.

UNBREAKABLE HANDLE HI-CARBON STEEL!

ONLY $1 set

FULLER TOOL CO., Inc. 3522 Webster Ave., N. Y. 67
Export Sales Dept.: John H. Graham Co., 105 Duane St. • New York, U. S. A.



***Paramount* AIR COMPRESSOR**

COMPARE *Price—Features—Savings!*

Reg. $24.95. Ball bearing, piston-type compressor of revolutionary new design. Can't be matched as an all-purpose, low cost unit. New principle operates it on conventional 1/4 HP—BUT delivers MORE air than ordinary 1/2 HP unit. **For professional paint spraying, tire inflating, insecticiding and hundreds other uses in shop, farm, home!** Delivers 2 1/4 cu. ft. air per minute. Includes Tank—Air Gauge and Air Regulator for adjusting pressure from 0 to 100 lbs. Order now and SAVE! **Satisfaction guaranteed or money back.** We pay postage. *Electrical Equipment Catalog on Request.*

$12.95 Prepaid

ROBERTS ELECTRIC CO., 849 W. Grand, Dept. 169, Chicago 22, Ill.

CUT COSTS with ALLEN Punch Press

1-Ton Power Bench Type

Powerful, Dependable, Economical

For light work—stamping, framing, riveting — metal, fiber or other material.

Overall height 17 1/2" . . . Base size 8 1/2" x 8 1/2" . . . Die bed 5 1/2" x 8 1/2" . . . Ram face 1 1/2" x 3 1/2" . . . Ram stroke 3/4" . . . positive 3/4" ram adjustment . . . sturdy single pin, non-repeat hand lever clutch . . . V-belt drive . . . weight 105 lbs.

The machine of a thousand uses! *Adequate for many types of work now done on larger presses at greater expense.*

$97.50 Less Motor

30-Day Money-Back Guarantee
Order TODAY. Price $97.50 F.O.B., Clinton, Mo. (Includes Motor bracket, V-belt, motor pulley, less motor)

ALVA F. ALLEN, Dept. PS, CLINTON, MO.

MAKES GOOD, SAFE, INSULATED ELECTRICAL CONNECTIONS

AMP *Super* CHAMP HAND TOOL

SPLICES!

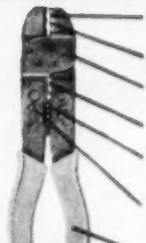
REPAIRS!

SHEARS BOLTS!

Now you can make *completely insulated* splices and connections in light cards, house wiring, T-V, appliances, car, etc. Just slip on AMP PRE-INSULATED connector and crimp with SUPER CHAMP tool. That's all there is to it—no fuss, no separate tools, no tape or solder needed!

ONLY $3.95

A WHOLE ELECTRICAL WORKSHOP IN ONE TOOL!



All this in one handy tool. Cuts wire, strips wire, crimps insulated terminals. Shears five popular bolt sizes without damage to threads: #4-40, #6-32, #8-32, #10-32, #10-24. SEND today for the amazing SUPER CHAMP tool—ONLY $3.95 complete!

© AMP AMP Trade-Mark Reg. U.S. Pat. Off.

FREE OFFER

AIRCRAFT-MARINE PRODUCTS, INC.
Consumer & Dealer Division
1319 American Building, Cincinnati, Ohio

Send this coupon today with $3.95. Receive your SUPER CHAMP tool with a FREE assortment of insulated TERMINALS & SPLICES.

NAME _____

ADDRESS _____

CITY _____ STATE _____

WAR SURPLUS BARGAINS SAVE UP TO 90%

SENSATIONAL GENERATOR BUY!!

Famous Navy NEA-5 Generator. Combination AC-DC Type. AC voltage—115 V. DC voltage —24 V. 200 Amp. 2 complete generators in 1 . . . 2 separate fields and 2 separate armatures on same shaft yet no larger than regular aircraft generator. Ideal for home, farm and shop lighting plants by hooking wires to AC side. DC side can be used for welding and operating war surplus low voltage hobby motors and equipment. Weight 54 lbs. NEW. Approx. GOVT. COST $350. Won't last long at **$27.50**

SPECIAL CARBON PILE TYPE VOLTAGE REGULATOR to go with above generator. Incl. mounting base and completely enclosed in steel-mesh box. Helps maintain constant current and prevents pulsation. Ideal for installation with above generator for lighting plant. Wt. 5 lbs. Complete NEW. Approx. GOVT. COST $90. Now only **$7.95**

BUY EM BOTH SAVE $5.45! Generator & Regulator together $30

NEW PI GENERATORS — Electric Auto-Lite, 200 Amps, 24 Volt, 2500 RPM, Dandy arc welder. Wt. 53 lbs. Approx. GOVT. COST $450. NEW, just **$19.50**

RI GENERATORS — RI Jack & Heintz. Rated 300 Amps. 30 Volts. Wt. 60 lbs. Approx. GOVT. COST $450. Guaranteed perfect, **$19.95**

MAKE YOUR OWN ARC WELDER Package consists of 1 NEW Auto-Lite PI generator, 1 giant toggle switch, 1 voltage regulator, wiring diagram chart showing conversion of Aircraft Generator to Arc Welder. SPECIAL—**$29.50**

"HELIOS" ORIGINAL TOOLMAKERS VERNIER CALIPERS

ULTRAPRECISION — Imported. Used by machinists at Lockheed, Douglas, Bendix, GM, RCA, GE. Model 51/2E. Genuine Helios. Hardened lapped precision surfaces. 1/1000" and 1/128" graduations. Handy slide roll and thumb lock. Quick, accurate depth. A $35 value. Satin finish. ALL NEW, just **$4.50**. Leather carrying case, **$1 extra.**

GEAR HEAD MOTOR

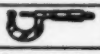
Use to run antenna, open or close doors and windows, Barbecue, displays, etc. Approx. 1 RPM, set for 140° turning with limit switches that remove for full 360° turning. 1. Amp. 24 volt D.C. 1/2 in. shaft dia. 3" RPM. 1/10 HP motor, micro-switches, reduction gears, mounting brackets — hobbyists! Barber-Coleman. Approx. GOVT. COST $90. Like new, only **$3.50.**

LOW VOLTAGE CIRCUIT TESTER

Made for U.S. Ordnance. Self-contained device makes complete & rapid check of generator battery circuit. Will check out any 6 or 12 volt system. Garages, mechanics, truck fleet owners, boat & marine mechanics. Guaranteed perfect. Shpg. Wt. 20 lbs. Approx. GOVT. COST $175. NEW, complete with steel carrying case & instruction book. WHILE THEY LAST—**$29.75**

SENSITIVE ALTIMETER IN 10 FT. INCREMENTS 0 to 35,000 ft. (inches of Mercury). Tested and inspected in our own instrument lab. Guaranteed perfect. Ready to install. **$12.95.**

MICROMETERS Chrome plated, precision engineered, carefully tooled to give long life. All new 0-1" cap. **$2.25** ea., 1-2" cap. **$3.50.**



Send 25¢ for big catalog. Bargains for everyone. Check, Money Order or Cash. 25% deposit on C.O.D. orders. Prices F.O.B. Culver City, Calif., Unless otherwise stated.

AIRBORNE SALES CO. INC., Dept. PS454 8501 Stellar Dr., Culver City, Cal.

QUALITY UNSURPASSED— PERFORMANCE UNEQUALLED

Yet Cost No More Than Ordinary Screwdrivers!

HOLD-E-ZEE

The Original AUTOMATIC GRIP SCREWDRIVERS

Much Wanted Special Features

EXCLUSIVE **LOK-BLOK** Makes Blade Twist & Impact Proof

AT ALL LEADING DEALERS

UPSON BROS., INC., ROCHESTER 14, N.Y.

X-acto

KNIVES • TOOLS HANDICRAFT KITS

#53 RAZOR SAW BLADE SET $1.75

X-ACTO, INC. 48-41 Van Dam St. Long Island City, N. Y.

Send 20¢ for 28-page Catalog

DO MORE PLANING JOBS WITH LOW COST BELSAW

LOW DOWN PAYMENT EASY TERMS

Exclusive MONEY-MAKING Features: • Full 12¾" x 6" capacity • Power feeds at 24' a minute • Provides for Grinding Knives in the Cutterhead • Attachments for Jointing, Rabbeting, Tongue, Groove, Matching. Convert low cost rough lumber into high priced cabinet finished stock . . . Easy to make flooring and popular patterns. Send today for free literature and prices.

BelsawMachineryCo.1024FieldBldg.KansasCity11,Mo

OIL FACTS FREE BOOKLET

AUTO-TRUCK-TRACTOR OWNERS STOP CHANGING OIL!

Impossible? Just send for FREE 32 page book, "Oil Facts" and judge for yourself—you'll be amazed. Learn how air lines, bus lines, etc., save on oil! Get the complete story on how "Reclaimo" re-refines oil as you drive!

RECLEAN FILTER CO., 5083 Elston Ave., Dept. P-4, Chicago, Ill.

WOODCRAFTSMEN'S 144 page ENCYCLOPEDIA 15¢

Bargain book of every conceivable woodworking item and tools. Full of How-To-Do-It information, illustrations, projects and ideas. Domestic and imported woods, inlays, panels, etc. Send for your copy today. Biggest 15c worth ever offered.

CRAFTSMAN WOOD SERVICE CO.

Dept. B-4-B, 2729 S. Mary Street, Chicago 8, Illinois

5 BIG POWER TOOLS in ONE

RETAIL PRICE $125.00

FACTORY TO YOU $79.95

SUPERSHOP is a PRECISION-BUILT WORKSHOP. 100% ball bearing. All running parts precision ground. Big capacity. Extra rugged. Amazing value. Write for FREE catalog.

BUY ON EASY PAYMENTS

POWER TOOLS, INC. 258 YATES AVENUE, BELOIT, WISCONSIN

MAKE YOUR OWN POWER LAWN MOWER

with this DRIVE CUTTER ASSEMBLY

For those who desire to build their own power mower. Complete with 20" blade and double ball-bearing drive. Only $13.95.

ONLY $13.95

Send check or M.O. Add 50c to cover handling and shipping.

SEND FOR FREE Power Mower Catalog

ATLAS KEEN MOWER 229 Southwest Blvd., Kansas City 8, Mo.

Take The "PAIN" Out of PAINTING

Basements . . . Fences . . . Furniture . . .

USE A BECKER CO_2

SPRAY GUN

Take It Anywhere!
No Compressor . . .
No Electric Cords Needed.
Sprays: Paints, Oil, Varnishes Insecticides, etc.

Men! Women! Here's the easy way to lick those tough, tedious, tiresome paint jobs. Becker Spray Gun is fun to use, requires no electricity or compressors—pressurized by low-cost CO-2 cartridges each sprays up to 21 oz. containerful. Used 5 years successfully in industry.

SEE YOUR DEALER! If he cannot supply, order direct for pstpd. shpt. Extra cartridges 10 for $1.

SULLIVAN-BECKER CO.
Dept. 124-D Kenosha, Wis.

ONLY $19.95 with box of 10 cartridges

WELD BRAZE SOLDER CUT

4 WAY WELDER

ONLY $14.75 f.o.b. factory

Complete with Twin Carbon Arc Torch and accessories . . . to handle all metal-craft work.

Acclaimed by thousands of Homeowners, Mechanics and Hobbyists as the welder of 1001 uses. Easily operated from properly wired 110 volt AC or DC line. The ideal gift with a life-long use....Order today on 10 day money back guarantee.

FOUR-WAY WELDER CO., Dept. F3-D
1810 S. Federal St. • Chicago 16, Ill.

NEW, IMPROVED CALCULATOR FOR WOODWORKERS only 25c

Instantly gives information on lumber, nails, concrete mixes, painting materials, etc. Convenient, simple to read. Just set dial for nail specifications, to convert linear to board feet, find bit sizes for screws, compare characteristics of woods. 6" diameter heavily varnished cardboard. Send 25c, no stamps, please to Greenlee Tool Co., 2124 Columbia Avenue, Rockford, Illinois.

SEND ONLY $1

for next 6 issues of famous DELTAGRAM, best home woodworking magazine you ever saw. Packed with shop-tested ideas—12 to 15 in *each* issue. Send $1 (no stamps) to: Delta Power Tool Division, Rockwell Mfg. Co. 504D N. Lexington Ave., Pittsburgh 8, Pennsylvania.

GET "New Car" POWER!

- **Stop Burning Oil!**
- **Restore Compression!**

$3.95 postpaid

A small amount of Fisher's Compression SEAL in each cylinder bore gives you the economies of smooth, powerful "new car" performance and reduced oil consumption. Old, tired engines may not need expensive overhauling. Only takes minutes to apply—yet gives you 10,000 more miles of low-cost driving pleasure.

Satisfaction Guaranteed!
Full purchase price refunded immediately, if not completely satisfied. *No solvent baths necessary.*

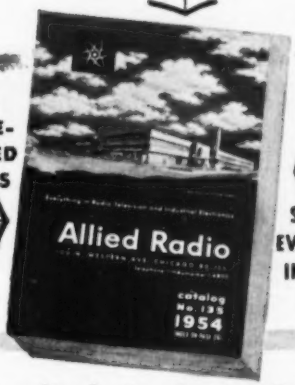
See your dealer today or order direct! Sorry, no COD's. Free information. Dealers inquire.

FISHER'S
4756 S. CENTRAL, DEPT. PS-4
LOS ANGELES 11, CALIF.

FREE GET THE WORLD'S LEADING TV & RADIO CATALOG

ALLIED'S 1954
ELECTRONICS BUYING GUIDE

268 VALUE-PACKED PAGES



SAVE ON EVERYTHING IN TV AND RADIO

Everything for Experimenters, Builders, Amateurs, Servicemen, Engineers and Soundmen . . .

Get ALLIED's big 268-page Catalog featuring the world's largest selections of latest top-quality electronic equipment at lowest, money-saving prices. See the newest in custom TV chassis, TV accessories, FM and AM radios, High-Fidelity sound, Amateur equipment, P.A. systems, recorders, test instruments, builders' kits, industrial electronic supplies—plus thousands of parts, tubes, tools and books. Get more for your money—send today for your FREE 1954 ALLIED Catalog!

NEW HOME OF ALLIED RADIO
ultra-modern facilities TO SERVE YOU BEST

ALLIED RADIO

SEND FOR FREE CATALOG

ALLIED RADIO CORP., Dept. 7-DD-4
100 N. Western Ave., Chicago 80, Illinois

☐ Rush FREE 1954 ALLIED 268-Page Catalog

*Name*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

Eliminate hard starting, rough idling, stalling, bucking and high gas consumption caused by a dirty, gummed up carburetor.

It's easy to clean the carburetor on your car with GUMOUT and KIT. Do it yourself—WITHOUT TAKING THE CARBURETOR OFF THE ENGINE. Engine performance will improve immediately. GUMOUT and KIT includes a pint of GUMOUT and a life-time service kit to feed quick-cleaning GUMOUT directly into the carburetor. Sold by leading AUTO SUPPLY STORES. If local dealer can't supply you, order direct. GUMOUT and KIT, complete, $3.95 postpaid. GUMOUT refills, $1.50 per pint can.

GUMOUT DIVISION
Pennsylvania Refining Company
2670 Lisbon Road, Cleveland 4, Ohio

VISE-GRIP AND FILE ONLY WILDERNESS PACK TOOLS RECOMMENDED BY YOUTH LEADER!

VISE-GRIP WRENCH

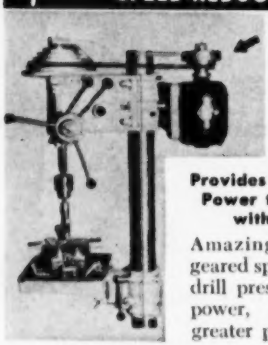
DOES MORE JOBS EASIER THAN ANY OTHER TOOL!

True stories like this show why Vise-Grip is the HANDIEST tool of all! A squeeze of the hand *locks* these powerful jaws onto work with *Ton-Grip*. Pulls, bends, turns, twists, ratchets, cuts — WON'T SLIP. A whole tool kit in one trim tool! At your dealer.

"As instructor of a group of youth leaders in wilderness camping, I recommended only 2 tools to be carried in a back pack: 7" Vise-Grip and axe-sharpening file. Recently I awarded 3 Vise-Grips as prizes for the most ingenious uses suggested for the tool. The list amazed me! It's the perfect woodsman's tool!" — Mr. T. H.

Made only by **PETERSEN MFG. CO., DEPT. P-4 DE WITT, NEBR.**

New **"PULL-GEAR" SPEED-REDUCING PULLEY**



Provides Correct Speed and Power to Drill Up to 1⅜" with ½ H.P. Motor

Amazing new internally geared speed reducer doubles drill press capacity. Greater power, greater efficiency, greater productivity.

Provides the correct speed and power for larger drilling, reaming, tapping and boring on light presses. Easily installed in five minutes. Adaptable to all type machines. Spindle speed range approx. 45 to 3000 RPM. Made in 3 motor shaft sizes: ½"—⅝"—¾". Write for literature.

WRITE FOR LITERATURE

THE PULL-GEAR CO.
25429 Mound Road
Centerline, Michigan

VARIABLE SPEED HYDRAULIC POWER TRANSMISSION

It has Infinite Speeds 0 to 550 Reverse Automatic Overload Protection: Adjustable Torque up to 180 inch pounds, ⅝" Input and Output Shafts. It will handle ¼ to 1½ H.P. Motor. Case measures 7½" long 7" high 6½" wide. VALUE OVER $300. Shipping Wt. 25#. On C.O.D. Orders we require a 10% Deposit. only **$54.50** Fob. Chicago

DIRZUIS MACHINE SHOP "M" 1423-25 52nd Ave., Cicero 50, Ill.

TRANSFORMER WELDER $19.95 FOB QUINCY

Complete with everything. Ready to plug in. 110 volts AC. 15-30 Amps. 3 heats. Welds metal from 1/16" to ¼" using 1/16" to 3/32" standard rods. Guaranteed unconditionally. 10-day trial. No C.O.D. Does everything welders costing up to $75.00 do. Buy direct and save.

ESSAY MFG. CO., INC., Dept. 47, Quincy 69, Mass.

MAGNETS 225 lb. PULL
GENUINE ALNICO—NEVER WEAKENS

AMAZING, PERMANENT MAGNETS—WILL NOT WEAKEN! NON-ELECTRIC

Retrieve guns, tackle, tools and other steel items from lake, river, plating tanks, drains or other hard-to-reach spots. Recover drills, taps, etc. from sweepings. Clear alley of harmful tacks, nails. Many other uses. Pays for itself quickly. GUARANTEED. Try any magnet one week. Money refunded if you are not well pleased.

No. S-725	(Weighs 54 oz.)	Has pull of 225 lbs. on steel block	$15.00
No. S-675	(Weighs 49 oz.)	Has pull of 175 lbs. on steel block	$10.50
No. S-650	(Weighs 41 oz.)	Has pull of 150 lbs. on steel block	$ 8.50
No. S-500	(Weighs 15 oz.)	Has pull of 50 lbs. on steel block	$ 4.00
No. S-30	Hobbyist assortment of six small magnets		$ 1.50

Send Money Order or check. We pay postage. No C.O.D.'s

MIAMI MAGNET COMPANY, 3240 N.W. 27th Ave., Miami 42, Fla.

BUILD YOUR OWN ARC WELDER OR LIGHT PLANT

D-C GENERATOR

Save $250 to $500

$15.50 used, good cond. Instruc. incl. for Comb. welder & light plant, 200 amps. 28 Volts. Or Brand New .....Price **$21.50**

PRICE F.O.B. K. C., MO.

CONVERTS TO ARC WELDER 200-250 AMP. OR LIGHT PLANT CAP. LOAD 5000 WATTS

115V.A.C. Generator Ideal Light Plant & D.C. Battery Charger Mfg. By G.E. Rated 1250 Watts, 10.9Amp. 400Cy. 115V A.C. & 200 Amp. D.C. 30 Volts. Stock #511 A.C.D.C. type. Gov't cost $300.00. Instructions incl. Used, good condition..... **$22.50** New **$32.50**

CORNELIUS AIR COMPRESSOR 2 Stage Piston type including ½ HP motor, pressure tank pop valve & fittings. Rated pressure 1500 P.S.I. with ½ HP 27 V DC series motor. For DC & Applicable for 110 V. A.C. or for belt drive with separate motor. Ideal for spraying, inflating & wherever compressed air is needed. Instructions incl. Gov't cost over $150.00..... **$21.50**

Send check or M. Order. Prices f.o.b. KCMo Except when marked postpaid U.S.A.

BEAM ROTATOR MOTOR. Powerful, reversible, free swing geared motor for TV aerials, Ham, FM, etc. Light weight approx. 7 R.P.M. incl. 3 mounting lugs. Applicable for 24 V DC and 110 V. A.C. Gov't cost over $100.00. Stock #572 Inst. incl.... **$12.95**

Stock No. 711 D. C. Generator R-1 Jack & Heintz rated 300 Amp. 30 Volts. Gov't cost $300.00. Instruc. for converting to welder or light-plant incl.... **$27.50**

RHEOSTAT #R - 27 Heavy duty for regulating the voltage on the converted P - 1, R - 1 welders, or AC - DC type ..... **$6.95** postpaid

CUNO OIL FILTER — BRAND NEW Aircraft type. Filters oil without cartridge replacements. Just turn handle and cartridge is clean. Std. ⅝" inlet & outlet ports. Inst. incl....postpaid **$4.95**

GENERAL SALVAGE CO., Dept. 244, 2922 E. 27 St., Kansas City, Mo.

MAKE MORE MONEY!

Dealers or Representatives Needed for nationally advertised line of Spark Plugs — Oil Filters — Auto Specialties — Liberal Proposition — Full or Part Time — Experience Not Necessary — Write Today

ENGINE PRODUCTS MFG. CO.

3801 E. Beverly Blvd., Dept. 149, Los Angeles 22, Calif.

GOLD-SILVER-COINS

Easily located with new Lightweight M-Scope Detector. Superior performance, lowest price, monthly payment plan.

FREE LITERATURE

FISHER RESEARCH LAB., INC.

PALO ALTO CALIF.

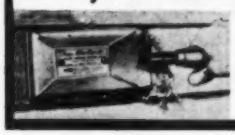
CARE WILL SAVE YOUR CAR

DO IT YOURSELF

Remove paint fast, easily, safely from houses, woodwork, boats with the **BRAND NEW**

LUDLOW ELECTRIC PAINT REMOVER

Super Glo-Torch



with G.E. Calrod 1000 watt, 115 volt AC-DC tubular heating unit!

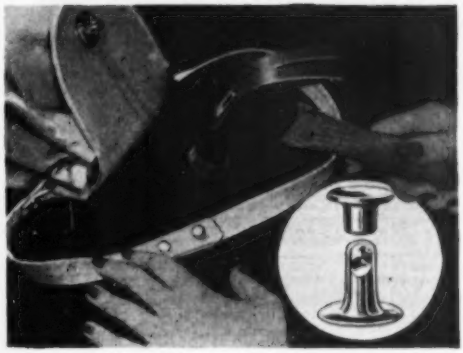
ANYONE CAN OPERATE IT! **$10.95**

LUDLOW PRODUCTS CORPORATION

1416 Broadway, Schenectady 6, N. Y.

Save money

DO IT YOURSELF with SPEEDY RIVETS



BIND REPORTS

REPAIR LUGGAGE

FIX FOOTWEAR

MEND CLOTHES

Do jobs you never thought you could do yourself . . . fasten leather, cloth, paper, plastic sheeting . . . ideal for craftwork, too . . . quick, secure, permanent. Simply punch a hole in each part to be fastened, push rivet together through holes, place on firm surface and swat with a hammer. Gilt, nickel, black, brown finishes. Large (6 to a card) or small (10 to a card) sizes.

AT HARDWARE COUNTERS EVERYWHERE 15¢ per card

THE DOT LINE

3229 South Ashland Ave., Chicago 8, Illinois

ace of Aces in LOW COST transportation

Up to 75 miles per gallon

Cushman is the top card in the transportation deck for speed, power—low cost operation. Ride it to work, for sport, school, on errands, deliveries. You're set to go! No traffic or parking worries either. And total operating cost LESS THAN A PENNY A MILE!

See your nearest Cushman dealer for FREE demonstration.

Write TODAY for FREE illustrated literature

CUSHMAN MOTOR WORKS, INC.

912 No. 21st St., Lincoln, Nebraska

NEW! Giant 1954 Catalog of AUTO PARTS AND Accessories

World's Largest Selection—50,000 Items at WHOLESALE PRICES!

YOU SAVE UP TO 50%

Ready now... **complete automotive buying guide**... everything for your car, truck, custom-styled car, or hot rod... all at rock-bottom **wholesale prices! Hard-to-find** equipment, parts for cars from 1920 to 1954 models! New HOLLYWOOD ACCESSORIES; HIGH-SPEED PARTS; CUSTOM-STYLING EQUIPMENT!

FREE...valuable Check Chart showing how you can know if your car is safe—sent free if you mail coupon for catalog TODAY with 25c to help pay postage and handling. We credit the 25c on your first $5-or-more order, so Catalog will then be FREE TO YOU. Fill in and mail Coupon NOW!

J. C. WHITNEY & CO., 1917 T-4 Archer Ave., Chicago 16, Ill.

148 Pages packed with items like these... all at Wholesale Prices!
Auto radios — Mufflers, pipes — Engines, parts — Transmissions — Tires, tubes — Tools — Springs, shocks — Ignition parts

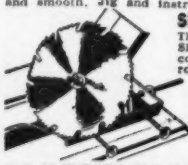
J. C. WHITNEY & CO.
1917 T-4 Archer Ave., Chicago 16, Ill.
Rush giant 1954 Catalog of auto parts and accessories at wholesale prices. I enclose 25c to cover part of cost, which will be credited to me on my first $5.00-or-more order.

Name .....
Address .....
City ..... *State* .....

FILE SAWS THE RIGHT WAY

SO EASY: With this new filing jig and jointer anyone can now sharpen any handsaw like new! When file hits hardened steel rollers teeth are finished and EXACTLY SAME HEIGHT. All teeth cut and saw runs true and smooth. Jig and instructions **$2.95** postpaid. Free literature.

SHARPEN YOUR CIRCULAR SAWS



The RIGHT WAY on your own saw table. Sharpens rip, cutoff, hollow ground and combination blades—6" to 10". Saws stay round with correct bevel. Precision made, easy to use. GUARANTEED. Only **$9.95.** Includes $3.00 Grinding wheel.

"TRU-CIRCLE" saw set automatically sets teeth at 10° or more **$2.95.**

AT DEALERS OR POSTPAID

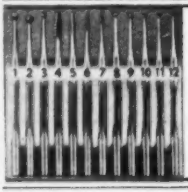
A. D. McBURNEY, 5908 Hollywood Blvd., Hollywood 28, Cal., Dept. S-40

BRONZE FOUNDRY

Schools and Home Workshops

Make your own castings of aluminum, copper, bronze, silver. Foundry sets are available in three sizes including 2400 Deg. F. blast Furnaces. $22.50; $29.50; and $42.00 f.o.b. Kansas City. Free Circular.

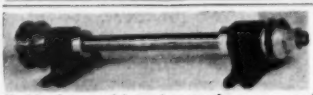
KANSAS CITY SPECIALTIES CO. P. O. Box 6022, Dept. S-4 KANSAS CITY, MO.



COMPLETE SET $1.25
of 12 Post Paid Only

Vanadium steel drills. 3/32" shanks. Assorted No. 1 to 12 or all the same (state which). Easily worth more than double our low price. Send check or money order.

GENERAL AIRE CO.
3523 Cottman Avenue, Phila., Pa.



ARBOR SET
Only **$4.85** Prepaid

Machined to precision tolerances for use on special machinery, grinders, saws, polishing wheels, sanders, jack shafts, routers, etc. Satisfaction guaranteed or money refunded.

Manufacturer of quality tools for craftsmen. Write for circular on tools and equipment available.

HANDY TOOL INC., P. O. Box 1425, Tilton, New Hampshire

Print Your Own

Cards, Stationery, Advertising, labels, circulars, photo and movie titles, church work, tags, etc. Save money. Sold direct from factory only. Raised printing like engraving, too. **Print for Others, Good Profit.** Have a home print shop. Easy rules supplied. Pays for itself in a short time. Write for free catalog of outfits and all details.

KELSEY PRESSES, N-33, Meriden, Conn.

KING MIDGET AUTO

Operate it for 75c per week. Amazing performance. Surprising comfort. All steel construction. Ready to run or assemble it yourself with our bolt together parts. Rider Agents wanted. Send 25c for detailed literature or $1 (refunded first order) for actual assembly book and service manual filled with photos, drawings, specifications, etc.

MIDGET MOTORS MFG. CO., ATHENS, OHIO

WORLD'S LOWEST PRICED 2 PASSENGER AUTO

GIGANTIC SAVE-TO-70% **MAIL SALE** WAR SURPLUS EXCESS INVENTORY BANKRUPT STOCK

AIR COMPRESSOR UNITS

Paint, clean, for tires, control termites, etc. Build your own.

- **DeLuxe Kit.** Tank, compresr, gauge, valves, paint gun, regulator, fittings, etc. $70 value **$45**
- **Compressors, $20.** Tanks $5.79. Press. Switch $4.95. Gauges (160 lbs.) $1.89.
- **Air Supply Unit.** Fill at filling station. Holds air indefinitely. **$15.95**

HYDRAULIC BARGAINS

Save to 80%. Build loaders, diggers, etc.

- **Cylinders.** 1-way 3"x8", **$11.95**; 2-way 2"x10", **$22.85**; 2-way 2"x24" **$28.90**
- **Pump.** 1000 lb. 12-gal. 500 RPM **$45.50**
- **Pump.** 1000 lb. 8-gal. 1500 RPM **$45.40**
- **Valves.** Control 1 or 2 way **$17.95**
- **Gauges.** 1000, 1500 or 3000 lb.. **$3.49**

Many hydraulic items in catalog.

WATER PUMPS & SYSTEMS

- **Centrifugals** ¾" ....**$19.95** 1" ..**$29.85**; 1½" ..**$38.60**
- **Rotary.** Bronze, rubber paddle. Self priming. Pressure to 30 lbs. ½", **$14.75**; ¾", **$19.50**; 1", **$25.**
- **Rotary.** Bronze-nylon roller. Self priming. Pressures to 100 lbs. ½", **$17**; ¾", **$24**; 1", **$32.**

Gauges, valves, couplings, hose, etc. Free advice.

POWER PLANTS & GEN.

- **Plants.** 25,000-W. 115-V. 60-C...**$1190**
- **Plants.** 5,000-W. 115-V. 60-C.... **$595**
- **Plants.** 3,000-W. 115/230-V. 60-C **$325**
- **Plants.** 2 to 2.5 KW. 115-V. 60-C..**$289**
- **Plants.** 1,000-W. 115-V. 60-C.....**$189**
- **Plants.** 3,000-W. 115-V. DC **$189**
- **Generators.** 3,000-W 115/230-V 60-C **$194**
- **Generators.** 2,000-W. 115-V. 60-C. **$139**
- **Generators.** 1,000-W. 115-V. 60-C. **$104**

Many other buys in catalog.

SUPER CLOSEOUT BARGAINS

- **Timer.** 15 sec. 110-v.....**$4.95**
- **Hi-Speed Grinder Set.** 110-v **$10.95**
- **Veeder** Root Counter. 0-9999.....**.99**
- **Canvas** Tarp. 9'x12' **$11.88**
- **Chain Saw.** Gas. leading make ..**$199.50**
- **W.E. Photo Cell** .....**.49**
- **Boat Trailer Winch** **$10.95**
- **Automatic 22 Cal. Revolver** **$37.80**
- **Repair Shop Test Meter** **$12.65**

ARMY PARTS CLEANER

- Air-solvent cleaner. Makes dirty greasy parts shiny bright. Wonderful for garages, factories, farm, repair shops.
- Heavy galv. tank 25 x 20 x 20", with valve, hose, hydraulic lid riser. Cost $100. Ppd. fct. **$29.95**

SPECIAL OF THE MONTH

D.C.-AC GENERATOR

- Brand new ball brg. G.E. unit, suitable for D-C welder, electroplating, high current battery charging, home emergency plant for lights, etc.
- Generates 200 amps at 30-v D-C. Also furnishes 115-v 800-c A-C at 2000 watts. Marvelous buy! 131 units available. Government cost over $300. Prepaid to you..... **$29.48**

GENERATOR 3000-Watt

- DC 115-volt. Fine for chain saws, drills, lights, etc. Ball bearing, compound wound Delco unit, 2800 R.P.M. List $195. . **Prepaid. $49.50**

ORCHARD-ESTATE POWER SPRAYER

Genuine Hydro-Jet pressure pump. 1½ h.p. Clinton engine. 30-gal. steel tank with agitator and 20' hose and hand spray boom. For truck farms, estates, factories, orchards, etc. List over $200. **$108.50 Ppd.**

We pay shipping charges. Send for catalog.

BURDEN SALES COMPANY
826 "O" St. Lincoln, Nebr.

All the Facts You Need About PORTABLE ELECTRIC TOOLS!

New **CATALOG!** Hundreds of time and money-saving ideas for hobbyists, builders, professional woodworkers! New 28-page catalog describes latest portable electric tools—how they work—what they do—where they save. Explains features and uses of electric saws, belt sanders, orbital sanders, disc grinder-sander-polisher, routers, planes, shapers, drills, bench grinders, chain saws, hedge trimmers—tool accessories. Shows what to look for when buying electric tools—how to get most value. Write today. Send 10c to cover postage and handling. **Send for your copy NOW!**

PORTER-CABLE MACHINE CO., 2684 N. Saline St., Syracuse 8, N. Y.

RUPTURE-EASER

Reg. U. S. Pat. Off. FOR MEN, WOMEN AND CHILDREN

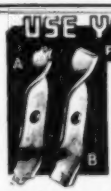
A strong, form fitting, washable support. Back lacing adjustable. Snaps up in front. Adjustable leg strap. Soft, flat groin pad. No steel or leather bands. Unexcelled for comfort. Also used as after-operation support. Give measure around the lowest part of the abdomen. State right or left side or double. We pay postage except on COD's. PIPER BRACE CO. 811 Wyandotte Dept. PS-44 Kansas City 5, Mo.

Pat. No 86871

Single or Left Side **$3.95** Double 4.95

USE YOUR BENCH SAW

FOR JOINTING & CUTTING MOULDINGS



With our six inch tool steel cutters **make mouldings, casings, drop-leaf tables, grooves beading and jointing. Moulding cutters. A 1 in. wide $1.75. 1½ in. $2.25. Jointing cutters. B 1 in. $1.75. 1½ in. $2.25. E 1 in. for drop-leaf tables. $1.75. E 1½ in. Makes ¾ in. cove & Quarter. $2.25. Postpaid. Guaranteed. State size hole. List & Folder free.**

JOHN A. SANDSTROM
Rt. 3-P. Clearwater, Fla.

NO PARTS TO FLY OFF!!

NEW! DO-YOUR-OWN PLUMBING

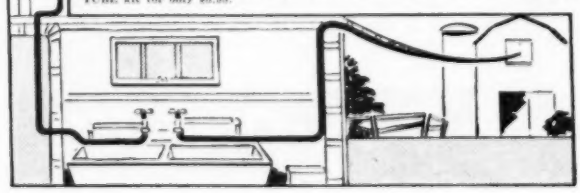
NAILABLE TUBE

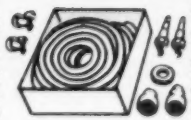
Save up to $50 by installing NAIL-A-TUBE

Now, available for the first time, a complete plumbing kit that lets you install semi-permanent cold water service any place you need it. Running water can now be put in your workshop, den, bar, garage, attic, basement, dark room, chicken-coop, watering trough or barn in less than 1 hour for only $5.95.

Install a complete automatic drain for your refrigerator, air-conditioner, workshop-sink, dehumidifier or any other appliance without the cost of expensive plumbing.

To install, simply tack specially flanged NAIL-A-TUBE* to the wall, baseboard or ceiling. Fittings connect tube to plumbing. Flexibility lets you install tube in one continuous length regardless of number of corners. No need for cutting, threading, multiple joints, elbows, pipe hangers or special tools with NAIL-A-TUBE. Frictionless features assure large flow of water. Transparency of tube** will blend with any color scheme, makes tube inconspicuous. For outside uses NAIL-A-TUBE can be suspended between buildings. Light weight makes possible long suspended water lines without extra supports. NAIL-A-TUBE won't break due to freezing water. Don't spend $30 to $50*** for a water connection when you can get the complete NAIL-A-TUBE kit for only $5.95.





Kit includes 50ft. NAIL-A-TUBE, all necessary clamps and fittings to connect to ½" and ¾" pipe and ¾" garden hose and complete installation instruction. ORDER TODAY on our 7-day money back guarantee. Specify whether you want IN-DOOR (translucent) or OUTDOOR-INDOOR (black) combination model. *TM & Pat. Pend. **Indoor model. ***Lic. Plumber's estimate.

$5.95

NAIL-A-TUBE COMPANY
36-37 35th ST., LONG ISLAND CITY 6, N. Y.
Please rush my Nail-A-Tube Kit to:

NAME _____ STREET _____

CITY _____ STATE _____

☐ INDOOR MODEL ☐ INDOOR-OUTDOOR MODEL
☐ SHIP POSTPAID* I ENCLOSE $5.95
☐ SHIP C.O.D. I WILL PAY POSTAGE $1 DEPOSIT ENCLOSED
For foreign orders add 50c (no C.O.D.s)

FREE PLAN
tells how to start your own business
FILING SAWS

Here is a steady repeat CASH business you can start in your own basement or garage in your spare time and make up to $3 or $4 an hour. You can file hand, band and cross-cut circular saws on the Foley Saw Filer. No eye-strain—no experience needed. "The first saw I sharpened with my Foley Filer came out 100%"—writes Clarence E. Parsons.

Every saw you sharpen with the Foley Saw Filer brings you more customers. "I rented a two-car garage and have all the work I can do" —Charles H. Smith.

FREE BOOK
"Money Making Facts" shows just how you can start at home in spare time, with small investment, no overhead—and develop into a full-time repair shop. Send coupon today—no salesman will call.

Send Coupon for Free Book

FOLEY MFG. CO., 419-4 Foley Bldg.
Minneapolis 18, Minn.
Send me free book "Money Making Facts"

Name.....

Address.....

Motor-Generator WELDER

No Separate Motor or Engine Required
Just Plug it in! REG. VALUE $350.00

- WELDS!
- CUTS!
- BRAZES!

140 AMPS. **$85.00** f.o.b.

For Heavy Work to Lightest Fine Job!
On a PORTABLE roller stand . . . can quickly be taken to the job. BRAND NEW! General-Electric motor-generator produces DC welding current up to 140 amps. Operates on AC or DC, 110 or 220 volts, 25-60 cy. Single or 3-phase. Welds straight or reverse polarity. Heavy-duty Ball Bearing construction. Has 7 welding ranges from 0 to 140 amps. Motor becomes power unit to Grind, Sand, Buff and Polish (with attachments incl.)

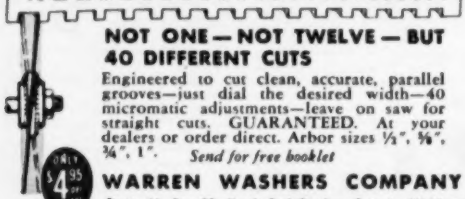
ACCESSORIES AT A BUY! Two 15-ft. cables, Ground Clamp, 300 amp. electrode holder, Ass't electrodes, Helmet, Simplified instructions. COMPLETE OUTFIT (shpg. wt. 85 lbs.) only **$98.50 f.o.b.**

FULLY GUARANTEED! You can't go wrong. Send for our

LIMITED OFFER! 10-DAY FREE TRIAL! ORDER FROM AD
Use it for 10 days. Be 100% satisfied or money back!

FREE . . . CATALOG of Motors, Electrical BUYS!
ROBERTS ELECTRIC CO., Dept. 167, 849 W. Grand, Chicago 22, Ill.

CUT PERFECT GROOVES WITH *Warren* WASHERS ON YOUR SAW BLADE!



NOT ONE — NOT TWELVE — BUT 40 DIFFERENT CUTS

Engineered to cut clean, accurate, parallel grooves—just dial the desired width—40 micromatic adjustments—leave on saw for straight cuts. GUARANTEED. At your dealers or order direct. Arbor sizes ½", ⅝", ¾", 1". *Send for free booklet*

ONLY $4.95 per set

WARREN WASHERS COMPANY
Dept. 44, Box 98, North End Station, Detroit, Michigan

BARRON *Drill Press* TOOLS

ROTARY PLANER

Planes • Rabbets
Tenons • Panels
Routs • Bevels

Only $8.50 COMPLETE

FOR WORKSHOP AND INDUSTRIAL USES . . .

● Over 40 precision built woodworking tools and accessories . . . Hi-Speed Router Bits—Rotary Surface Sanders & Drum Sanders—Safety Shaper Cutters—Dovetail Cutters—Large Auxiliary Metal Tables—All Metal Shaper Fences — Spindle Adapters — Handy Bench Vises. Many other items indispensable for accurate, useful, versatile workshop use. Every tool sold on complete satisfaction or your money back. See your Barron Dealer. Ask for special folder — "24 Extra Uses for Your Drill Press."

FREE Workshop Guide & Catalog

BARRON TOOL CO. INC.
354 Architects Bldg., Detroit 1, Mich.

---

3 CU. FT. MIXER DIRECT FROM MFR. 39.75

Fills long felt need for small mixer for concrete, feed, fertilizer, seed and many other materials. Saves ¼ cost of ready mixed concrete. Pays for itself on first job. Combination belt pulley and crank for hand operation. Also power mixers. Write for circular.

3 Cu. Ft. Drum—Mixes 2 Cu. Ft. Concrete $39.75
5 Cu. Ft. Drum—Mixes 3 Cu. Ft. Concrete 59.50

FOB Pulaski, N. Y. Cash, Check or M. O. Money back guarantee

UNITED STATES FORGE AND FOUNDRY CO
CONSTRUCTION EQUIPMENT DIV PULASKI NEW YORK

ONE-MAN SAWMILL LOW AS $50.00 DOWN

FREE BOOK

Take BELSAW Portable Sawmill right to the trees—turn out valuable lumber for home and farm — sell to local yards — make up to $50 a day custom sawing for neighbors. BELSAW lasts a lifetime. No crew needed. Power with tractor or auto engine. Beginners get excellent results. Send today for FREE BOOK. "HOW TO MAKE LUMBER".

BELSAW MACHINERY CO
8466 Field Bldg. Kansas City 11, Missouri

GOLD - SILVER - URANIUM

GEIGER COUNTERS (as shown) for Uranium Detection. **TREASURE DETECTORS** for gold, silver, etc. Lightweight, ultra sensitive. None finer. Also Mineralights for Tungsten.

● INFORMATION FREE ●

Dept. PS-6

Detectron CORP.
5420 Vineland, North Hollywood, Calif

Also Eshelman **SPORT CARS WORLD'S LOWEST PRICE** 70 Miles Per Gal. Holds 1 Adult. Free Literature

ESHELMAN ROTARY TILLER

ONLY $99.95

Turns virgin ground into a garden bed in one operation. Replaces plowing, discing, and cultivating. Women can operate it. **Also 1 to 8 H.P. POWER MOWERS & RIDING TRACTORS from $69.** Free Catalog. Write:

ESHELMAN CO., Dept. T-44
119 Light St., Balto. 2, Md.,
333 N. Michigan Ave., Chicago 1, Ill.
7070 Hollywood Blvd., Los Angeles 28, Cal.

In the kitchen

A few drops of highly penetrating 3-IN-ONE make appliances run better. It never gums up the way many oils do.

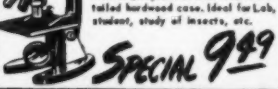
"3-IN-ONE" OIL ®

NEW 100-200-300 POWER 'HYPOWER' MICROSCOPE

Here's a VALUE UNSURPASSED ANYWHERE! Has a triple objective revolving turret with 3 lenses that will allow 100, 200 or 300 power magnification. All-metal body built to incline through 90°. Built-in micro adjustment. Adjustable sub-stage mirror. Complete in handsome dovetailed hardwood case. Ideal for Lab, student, study of insects, etc.

SPECIAL 9.49

BARGAIN HOBBY MOTOR

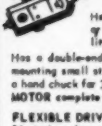


Here's a real value for the hobbyist or home mechanic. This powerful little motor turns 2500 to 3600 RPM

Has a double-end shaft fitted with an arbor for mounting small stones, wheels, buffers, etc. and a hand chuck for 3/32" and 1/8" shanks. MOTOR complete with arbor & chuck ---- 3.99

FLEXIBLE DRIVE-SHAFT for HOBBY MOTOR 31 inches long and complete with necessary adapters to take, grinding, buffing, polishing, wheel, etc. Shaft is 7/32" dia. Makes this motor a very versatile bench tool. 2.99

30 PIECE DRILL KIT



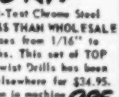
Hi-Speed-Hi-Test Chrome Steel Drills at LESS THAN WHOLESALE PRICES! Sizes from 1/16" to 1/2" in 64ths. This set of TOP QUALITY Twist Drills has been advertised elsewhere for $34.95. We offer them in machine or jobbers lengths. 9.95

FAMOUS SURPLUS MIXES

Palley HOSE CLAMP MIX – 24 Assorted size clamps – all of the finest aircraft quality. Ideal for use on auto, truck, tractors, boats, planes, etc. Don't be without this amazing War Surplus Bargain. 2.89

GADGET MIX – Another SURPLUS BARGAIN! This amazing mix includes a "TREASURE" of small parts such as; Cogs, Worm Gears, Wheel Bearings, Rivets, Spacers, Bolts, Screws, Springs and Clamps. 5 pounds for ONLY 1.19

MARCHING COMPASS



Lensatic type. An all-purpose precision instrument for surveyors, hunters, sportsmen, boy scouts, hikers, etc. Can be used for map orientation, taking azimuth reading or as a guide in unfamiliar terrain. The bezel ring is marked in 3° notches for computation and rotates through 360 degrees. Has a special "peep" sight and hair-line guide in lid for taking a bearing on a distant landmark or object. 3.95

NAVIGATORS MAGNETIC COMPASS

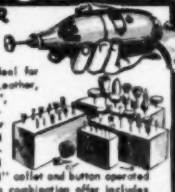
British Navy Type P-11. Like New. Has a rotating verge ring, calibrated in 1 degree increments from 0 to 360°. Two parallel grid wires for N-S and E-W line alignment. Ideal for small boats. 9.95

NAVY OCTANT

Made for the U.S. Navy by the Pioneer Instrument Co. Type Mark 4. Designed for use in aerial navigation. May also be used on land or ocean. Has artificial horizon, dual prism, 4 filters, astigmatizer lens and many other valuable parts. The parts alone are worth many times the price. Will give accurate calculations in sighting Sun, Moon and Stars. In original hardwood case 37.50

SAVE UP TO 85% GOV'T SURPLUS

200 Pc. POWER TOOL SET

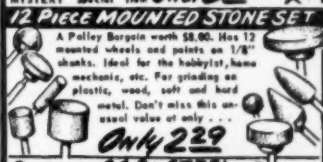


Drills, Buffs, Polishes, Grinds, Engraves, Carves and many other uses. Ideal for Wood, Metal, Plastic, Leather, etc. Powered by a "Duro", universal motor, streamlined to fit the hand. Motor operates at 20,000 RPM on 110 volt AC or DC current. Has fully sealed ball bearings, a 3/32" and 1/8" collet and button operated chuck lock. This amazing combination offer includes 5 COMPLETE SETS of mounted stones, metal burrs, polishing brushes, discs, drills, felt wheels. 200 PIECES IN ALL 19.98

BAKERS DOZEN HOBBY & LAB KIT

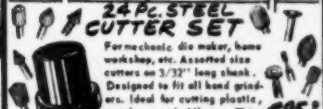
Every Hobbyist, Model Maker, Lab Worker, etc. will want this. Kit contains 1 Hobby Hammer with brass head, 2 inspection mirrors with detachable handle, 2 surgical hemostat clamps, 2 scalpels in case, 2 tweezers, 2 shaping tools & a Palley MYSTERY Special Item ONLY 5.99

12 PIECE MOUNTED STONE SET



A Palley Bargain worth $8.00. Has 12 mounted wheels and points on 1/8" shanks. Ideal for the hobbyist, home mechanic, etc. For grinding on plastic, wood, soft and hard metal. Don't miss this unusual value of only . . . Only 2.29

24 Pc. STEEL CUTTER SET



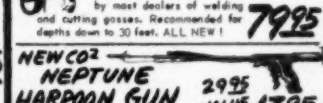
For mechanic, die maker, home workshop, etc. Assorted size cutters on 3/32" long shank. Designed to fit all hand grinders. Ideal for cutting plastic, metal or wood. All new. This $20.00 Value complete in handy plastic case. 6.95

DIVING EQUIPMENT

NEW SELF CONTAINED DIVING UNIT

The new improved Sport Diver is designed exclusively for the underwater swimmer and diver. Allows up to one hour under water. This is a completely equiped unit consisting of a high pressure air flask, valve, pressure reducing regulator, breathing tube, demand regulator, mouthpiece and harness. The air flask can be refilled by most dealers of welding and cutting gasses. Recommended for depths down to 30 feet. ALL NEW! 79.95

NEW CO2 NEPTUNE HARPOON GUN



29.95 VALUE 13.95

Has JET POWER – Simplest, most effective underwater gun. Made for one arm use. Weighs only 27 ozs. Has 150 lb. nylon line on snag-proof line reel. Positive safety catch. Rust resistant finish on all metal body.

CO2 CHARGES – Box of 10 charges for above gun. ONLY 98¢

OXYGEN TANK SPECIAL – Gives up to 1 hour underwater at average depth. Has 15 lb. capacity – 48 cu. ft. Size: 6½" diam. x 23½". 17.95

BUILD YOUR DIVING LUNG! Palley's carries all parts and equipment for skin diving. Write TODAY for info on our build-it-yourself aqua lung for $42.95.

STOP BOAT LEAKS WITH NEW FIBERGLASS

Amazing New FIBERGLASS! Guaranteed to PROTECT and WATERPROOF your boat up to 10 YEARS if applied according to our instructions. Fiberglass will permanently protect decks, cabins, bottoms on any size boat. Stops leaky seams, rotted planks, boat worms. These amazing kits specially prepared for us by nationally known Stanford's Fiberglass Co. Each kit contains a special process resin, fiberglass, brush, squeege and complete instructions for use.

– KITS TO COVER BOAT BOTTOMS –

8 ft boat	$14.95	14 ft. boat	$34.95
10 ft. "	24.95	16 ft. "	36.50
12 ft. "	26.50	18 ft. "	44.50

Also available – Kits to cover bottom, sides and transom. Sizes same as above. Write for prices.

FIBERGLASS MENDING KIT Ideal for mending or patching Boats, Trailers, Station Wagons, etc. . . 2.95

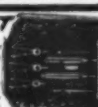
FIBERGLASS HOBBY KIT Make models of all kinds – boats, planes, cars, trailers, etc. 4.95

AVIATORS (AN-6530) WINDPROOF GOGGLES

Genuine Army type. Have interchangeable, precision ground lenses. Your choice of 3 lens colors – Clear, Amber or Green. Metal frames are rubber covered with soft, chamois lining and have built-in, non-fogging breathers. Also has adjustable nose bar. 2.79

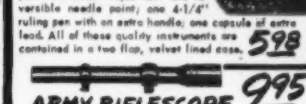
EXTRA LENSES – Choice of colors above. Price per pair . . 1.39

9 Pc. DRAWING KIT



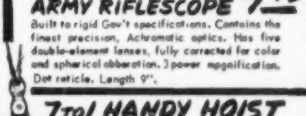
Suitable for architect, draftsman, artist, student, etc. Has 9 separate pieces – one 5½" divider; one each 3½" bow divider, bow pencil and bow pen with wheel adjustment and reversible needle point; one 4-1/4" ruling pen with an extra handle; one capsule of extra lead. All of these quality instruments are contained in a two flap, velvet lined case. 5.98

ARMY RIFLESCOPE 9.95



Built to rigid Gov't specifications. Contains the finest precision, Achromatic optics. Has five double-element lenses, fully corrected for color and spherical abberation. 3 power magnification. Dot reticle. Length 9".

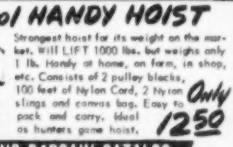
7 to 1 HANDY HOIST



Strongest hoist for its weight on the market. Will LIFT 1000 lbs. but weighs only 1 lb. Handy at home, on farm, in shop, etc. Consists of 2 pulley blocks, 100 feet of Nylon Cord, 2 Nylon slings and canvas bag. Easy to pack and carry. Ideal as hunters game hoist. Only 12.50

WORLD'S MOST AMAZING BARGAIN CATALOG

1954 EDITION 320 PAGES



Packed with SENSATIONAL VALUES in WAR SURPLUS, FACTORY CLOSE-OUTS and GENERAL MERCHANDISE! Fully Illustrated. Thousands of items in Hand & Power Tools, Outdoor & Sporting Equipment, Hardware, Photo Supplies, Foam Rubber, Industrial Tools, Aircraft Parts, Metals, Plastics, Gadgets, Hydraulic Supplies & many, many more.

Only 50¢ To cover handling & mailing costs – REFUNDED with your first order.

PALLEY SUPPLY CO 7263 E VERNON AVE DEPT PS-4 LOS ANGELES 58, CALIF

Order From This Ad Pay by M.O or check P.O.'s accepted from D&B firms ½ deposit with C.O.D.'s All Prices FOB Los Angeles

How Much Did You Learn?

By Sanford E. Taylor and Helen Frackenpohl

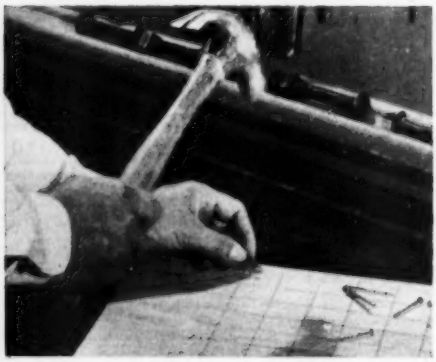
Washington Square Reading Center, New York

Now you can sample how much you remember of the useful and interesting information packed into this issue of POPULAR SCIENCE MONTHLY. Answers to the questions are printed just below the quiz. After each answer is a page reference to the article on which the question was based.

1. Kaiser upped its Manhattan 22 horsepower with a factory-installed supercharger of the

a. Roots type
b. McCulloch type
c. centrifugal type

2. These hands are



a. building a hi-fi cabinet
b. testing nails
c. designing a new parlor game

3. Tiny cameras have one big advantage over larger models:

a. unobtrusiveness
b. simplified operation
c. less darkroom work

4. The insecticides, OMPA and Systox,

a. form a deadly film on upper plant surfaces
b. condense on the lower sides of leaves
c. impregnate the entire plant

5. The recently designed atomic locomotive would burn

a. liquid fuel
b. uranium sealed in aluminum cans
c. irradiated anthracite

6. Fishermen giving their reels a spring tune-up should remember this general rule:

a. grease on gears, oil on bearings
b. oil on gears, grease on bearings
c. grease on all moving parts

7. The makers of the famous Louisville Sluggers produce

a. 6,000,000 bats a year
b. 3,000,000 bats a year
c. 1,000,000 bats a year

8. Oregon highway planners have gone into small-scale model building on a large scale primarily to

a. catch errors in design
b. help in routing and regulating traffic
c. aid in area planning and landscaping

9. The first passenger car engineered in the U. S. for sale here, but built abroad, is the

a. Vanguard Cadet
b. Nash Rambler
c. Nash Metropolitan

10. The Makalu climbers hope for a tough ascent, because they are studying the effects of

a. cosmic rays
b. stress
c. discouragement

Answers: 1. b—p. 124; 2. b—p. 174; 3. a—p. 194; 4. c—p. 114; 5. a—p. 137; 6. a—p. 219; 7. b—p. 132; 8. a—p. 183; 9. c—p. 106; 10. b—p. 97.

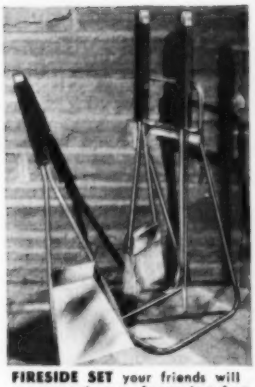
Coming Next Month—

MECHANICS: How farm tractors are tested.

AUTOS: How to install your own power brakes.

HOMEBUILDING: How to make wood last longer.

You Can Make Every Project on this page



FIRESIDE SET your friends will rave over is easy fun-project for you . . . with inexpensive Reynolds *Do-It-Yourself* Aluminum. Reynolds Plan #101. See Coupon.

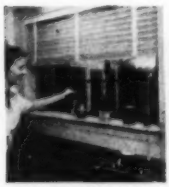
ALUMINUM SCREENS that never rust or stain are much easier to make with Reynolds *Do-It-Yourself* Aluminum than wooden ones. Free instructions. See Coupon.

...quickly, inexpensively with REYNOLDS *DO-IT-YOURSELF** ALUMINUM

You start with a simple plan. You finish up with beautiful things for your home that would do credit to a professional craftsman. Yes, even if you're a beginner. Here's the secret. Reynolds *Do-It-Yourself* Aluminum is specially made for really astonishing workability. You can bend it, saw it, drill it, plane it, joint it and shape it, using standard woodworking hand or power tools.

TEN PLANS IN ONE

Pictured below are three of ten useful fun-projects that you'll find in one 25c Reynolds Plan (#102). See Coupon.



WINDOW SILL COVER cut from Reynolds Aluminum Sheet. Protects the wood beneath, stays sparkling-clean.

TOWEL RACK made in a jiffy from Reynolds *Do-It-Yourself* Aluminum is handy, smart . . . and won't rust ever!

RUSTPROOF RAILINGS made from this wonder-metal look like a million dollars, cost amazingly little.

Have fun . . . *and* save money!

With no previous skill you can now make hundreds of wonderful things for your home. And you'll save as much as 75% on one single project. You'll save money on *repairs*, too. Reynolds *Do-It-Yourself* Aluminum comes in plain and embossed sheets, tubing, bars, rods, angles, screen sections, handy fasteners.

*T. M. REYNOLDS METALS COMPANY

LOOK FOR THIS RACK *at your hardware or building supply dealer. Ask him about Reynolds Building Products and Liquid Aluminum, the wonder-coating that's made by leading paint manufacturers.*

NO SPECIAL TOOLS *are needed to work this new material. But be sure to use only Reynolds Do-It-Yourself Aluminum with the special Seal on every piece . . . other types of aluminum may harm tools.*

SEND FOR THESE REYNOLDS PLANS TODAY!

Reynolds Metals Company, 2493 South Third Street, Louisville 1, Kentucky

Please send me Reynolds Do-It-Yourself Plans, folders, booklets as checked below. I enclose 25c for each plan ordered.

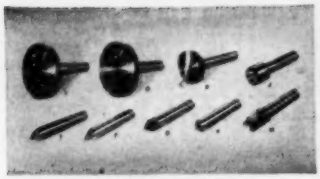
- ☐ Reynolds Plan # 101 for FIRESIDE SET 25c
- ☐ Reynolds Plan # 102 for WINDOW SILL COVER, TOWEL RACK, HAND RAILING plus 7 other simple projects, all 10 plans for 25c
- ☐ Instruction folder for making ALUMINUM SCREENS (free)
- ☐ "How-to" booklet containing general instructions and list of suggested projects (free)

REYNOLDS DO-IT-YOURSELF ALUMINUM

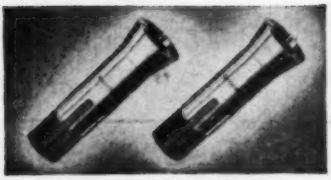
Name _____

Address _____

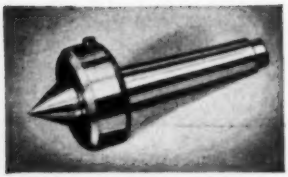
City _____ Zone _____ State _____



CENTERS AND DRILL PADS



STEEL AND BRASS COLLETS



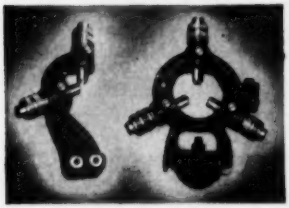
BALL BEARING LIVE CENTER

HANDWHEEL COLLET ATTACHMENT

YOU CAN DO MORE WITH SOUTH BEND LATHES

because of the very complete line of practical attachments available. Only a few are shown here. Send for complete catalog.

SAFETY and STANDARD LATHE DOGS



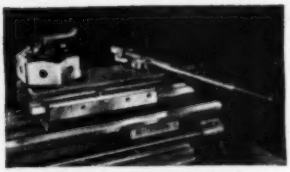
FOLLOWER AND STEADY RESTS

ADJUSTABLE COLLET BUSHING CHUCK

South Bend Attachments will enable you to do more and better lathe work. Write for our new Attachment Catalog.

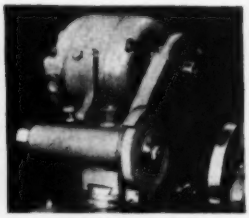
SOUTH BEND LATHE

BUILDING BETTER TOOLS SINCE 1906 • SOUTH BEND 22, INDIANA



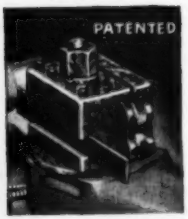
HANDLEVER BED TURRET

TELESCOPIC TAPER ATTACHMENT



EXTERNAL GRINDER

MILLING ATTACHMENT



10 in 1 TOOL BLOCK

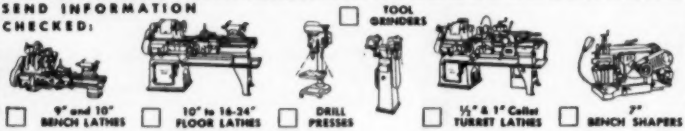
Yes—you can get most any South Bend product immediately from our distributor's stocks in principal cities. Items not stocked, shipped promptly from factory.

Three ways to order:

1. See or telephone nearest distributor.
2. Order by mail from your distributor.
3. If no distributor is nearby, order direct from factory.

South Bend machine tools with accessories may be purchased on convenient terms up to 18 months.

SEND INFORMATION CHECKED:



☐ 9" and 10" BENCH LATHES ☐ 10" to 16-24" FLOOR LATHES ☐ DRILL PRESSES ☐ TOOL GRINDERS ☐ ½" & 1" Collet TURRET LATHES ☐ 7" BENCH SHAPERS

Name_____

Street_____ City & State_____

Building Better Tools Since 1906 • **SOUTH BEND LATHE** • South Bend 22, Indiana

2½ Times around the World— 61,810 miles on ONE Set of ordinary SPARK PLUGS

....Yet they still perform as though the engine was made for them!

Another spectacular success story for the Magna-Power Acid Neutralizer—with the porcelain insulators "shot" on three (due to accidental breakage) this set of plugs still does not misfire. The engine still idles perfectly, and smoothly—and picks up speed quickly without bucking. When new plugs were finally installed, there was no detectable difference in performance and economy.

How Is This Possible?

These plugs might even last another 60,000 miles or more. This amazing record of spark plug endurance was made possible by eliminating the corrosive acids from the engine oil!

HERE IS PROOF

These are FACTS gathered in 13 years of road tests over millions of miles in 1500 cars and trucks —NOT laboratory tests under simulated conditions.

IS IT ACID OR FRICTION?

Engine friction—is negligible. Our tests show almost no metal to metal contact. Acid is the real cause of motor deterioration.

1. POWER

No engine tested decreased in power. Many have gone 120,000 miles. Top performance is yours almost indefinately—one, two, five or even ten years. Most protected engines are outlasting their bodies.

2. IGNITION

Spark plugs last up to 60,000 miles —waste less gas. The spark plug shown is from a set of 8 after 61,800 miles—the entire set still testing 95% efficient!

Actual photo after 61,810 miles, showing good condition of the electrodes.

3. FRICTION WEAR ALMOST DISAPPEARS

Fleet tests show wear reductions of almost 6 to 1 in stop and go service.

The bearing at left is from an engine with Magna-Power after 112,000 miles in 11 years. It is still good for many more years and 4 times the miles. At right, one from an unprotected engine after 65,000 miles; WORN OUT!

SULPHUR FORMS ACIDS

In 1000 gallons (enough for 15,000 to 20,000 miles) there is about 6 lbs. of sulphur—enough to make 3 gallons of strong sulphuric acid—plus bromine and chlorine. When gasoline burns, corrosive gases (SO_2, SO_3, HBr and HCl) blow by the pistons into the crankcase. Here they combine with condensed water (also blown by) to start a vicious circle. SO_3 is a thirsty compound. It absorbs water to form sulphuric acid, which in turn attracts more water, which absorbs more SO_3, which in turn attracts more water! This water body absorbs gases to form H_2CO_3, H_2SO_3, HCl and HBr—all corrosive acids. Acids cannot work without water—but your engine makes large amounts of it—about a gallon for each gallon of gas; you have seen it drip from your exhaust!

ENGINES HAVE SHORT LIFE

In door to door service they have appallingly short life. Often only 15,000 to 20,000 miles! Enough gases blow into the oil to make a pint of acid a day. Most of these go out the breather but the small amount left is enough to damage your engine seriously. Even carbonic acid, which you drink in soda pop, is powerful enough to corrode iron ⅛ inch per year.

NEW DIRECT WAY TO KILL ACIDS

Acids destroy themselves by eating metals. Acids first attack metals most easily eaten. Almost perfect protection is obtained by a special magnesium-aluminum alloy. Since magnesium is by far the most easily attacked metal in the engine, the acids eat it and are destroyed. Without acids, water is no longer held. Without water, acids cannot form. The vicious circle is interrupted. Less sludges, gums and resins are formed.

SUMMARIZING:

Normal wear, as you know it, does not exist. Manufacturer's figures are increased up to 10% in economy, speed, power. Engine wear life is increased to at least 300,000 miles by adding the Magna-Power Acid Neutralizer. Magna-Power will help any engine using less than 1 qt. of oil each 500 miles, OR YOUR MONEY BACK.

Get One Now for Your Next Oil Change — JOHNS MFG. CO., Dept. B4, Dunellen, N.J.

WHY SULPHUR IS THE REAL ENEMY OF YOUR SPARK PLUGS AS WELL AS YOUR AUTO ENGINE

Gasoline has sulphur in it. When sulphur burns it makes sulphuric acid—right inside your engine. Sulphuric acid eats metal; it destroys detergents and spawns more acid. Little by little your engine is eaten away; the spark plugs destroyed. To combat this, most oil companies are now using anti-acids. But what happens when these compounds are overcome? Your engine corrodes once more! Acid is nature's method of reducing metals to their primitive state. Most oil companies have proven acid corrosion the cause of engine wear.

Winthrop A. Johns and the original test car—says Win. "I don't expect to live long enough to wear this engine to the first overhaul! At the present rate of wear it will run at least 700,000 miles, if the parts do not break from 'fatigue.'"

HOW TO NEUTRALIZE THIS ACID

ACTION The easiest and surest way, is to use a solid chemical neutralizer attached to your oil drain plug. The Magna-Power is a drain plug with a rod of a special alloy of magnesium, by nature alkaline. Acids much prefer magnesium to other engine metals but in eating it these acids are destroyed. There is enough alloy to last at least 100,000 miles.

THIS IS A VERY SIMPLE IDEA It was developed by a mechanical engineer after many years of trial and error, using such compounds at first as potash and magnesium shavings; none were as easy, simple or positive as this oil-drain plug device.

IT IS THOROUGHLY TESTED

Milk fleets, passenger cars, bus lines and trucking companies all have tested the Neutralizer in controlled field operations. Their enthusiastic letters are available for your inspection at any time.

YOU CAN SEE THE ACTION IN A FEW SECONDS

If you drop a Magna-Power Neutralizer into a glass of vinegar, it foams wildly. Even grapefruit juice effervesces.

EXPERIMENT WITH THE MAGNA-POWER

NEUTRALIZER AT OUR RISK

If you are not satisfied send it back, at any time (years from now, if you choose), for an immediate refund.

JOHNS MFG. CO., Dept. B4, Dunellen, N.J.

My car is a ..... (make) ..... (year).
Please send me a MAGNA-POWER acid neutralizer. I enclose $2.95. I understand that it is sold with an unconditional guarantee of satisfaction or my money back!

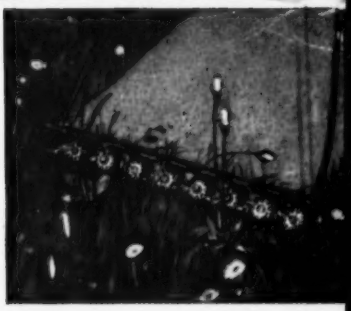
Name .....

Street .....

City ..... State .....

© 1954 John Shrager Inc. Adv.

You can do the whole job with a MONTAMOWER



The MontaMower smoothly cuts a full 16" swath of grass, cleanly cutting all the dandelions and tall lawn weeds which the reel-type mower leaves standing . . . no more going back over the lawn with a whipper!

The MontaMower eliminates back-breaking hand trimming. Unlike the conventional mower, it is actually two tools in one . . . mower and trimmer!

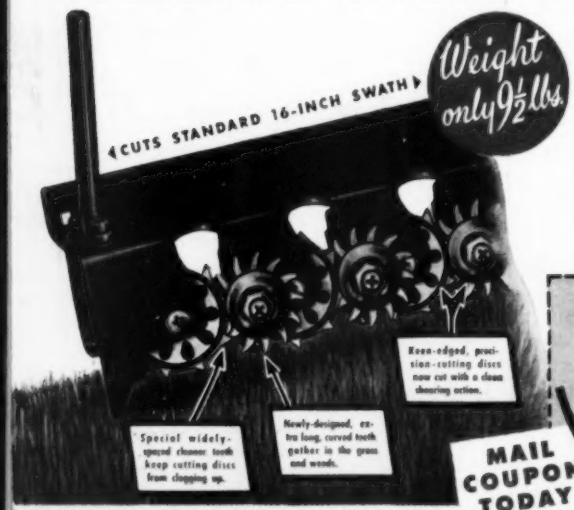
The MontaMower "Trims-as-it-cuts" right up close to fences, trees, buildings, walks, shrubs, flower gardens and cement walls.

The MontaMower is so light that even women and teenagers can mow steep terrace banks, up, down, or across, with scarcely any effort!

ONLY MONTAMOWER TRIMS as it MOWS — IN ONE EASY OPERATION

The versatile MontaMower is actually "Two-Tools-In-One" . . . an efficient lawn mower and a very fast lawn trimmer. Due to its unique patented design it is the only machine that does the *whole job* of lawn cutting and trimming in one easy operation. Its live, precision mechanism first gathers, then smoothly cuts a clean 16" swath through grass, dandelions and tall lawn weeds as evenly as a pair of keen-edged shears. It cuts right up to trees, walls, fences and borders . . . "Trimming-As-It-Cuts" . . . leaving practically no back-breaking, time-consuming work to be done by hand. Enthusiastic owners throughout the world tell us the MontaMower is the most practical hand lawn mower ever designed! Even power mower users say it's a "Must" for close-quarter mowing and all the trimming! Fast, efficient and weighing only 9½ lbs., you'll find it's the most wonderful work-saver and time-saver you've ever had for lawn care.

HERE'S HOW IT WORKS Eight pairs of newly designed, Self-Cleaning and Self-Sharpening, precision made and fitted, tool steel cutting discs revolving toward each other gather the grass and cut it cleanly with a new shearing action. Newly designed handle with comfortable form-fitting rubber grips is easily adjustable to change cutting height of grass. The MontaMower's drive shaft, with factory sealed bearings, is permanently lubricated to assure *smooth, trouble free* performance and long life. (Hundreds of thousands in world-wide use.) SOLD WITH OUR WRITTEN GUARANTEE!



SOLD DIRECT ONLY — NO AGENTS — NO DEALERS
HOWEVER, YOU CAN PAY FOR YOUR MONTAMOWER THRU OUR OWNER'S COOPERATION PLAN!

MAIL COUPON TODAY
PASTE ON POSTCARD

TRY THE VERSATILE MONTAMOWER ON YOUR OWN LAWN . . . ON APPROVAL!

An actual trial on the lawn where it is to be used is the most convincing proof of the exclusive advantages of a MontaMower and its superiority to conventional mowers. We have, therefore, developed a most attractive "TRY IT ON YOUR OWN LAWN ON APPROVAL OFFER" for those who are definitely in the market for lawn mowing equipment of one type or another. Don't miss this opportunity to see for yourself how invaluable the MONTAMOWER would be to you! Act NOW! Fill out the coupon below . . . Mail it today!

WRITE FOR DETAILS OF OUR ATTRACTIVE TRIAL OFFER

MontaMower Distributing Co., Sales and General Offices
PS-44 KEELER BLDG., GRAND RAPIDS 2, MICHIGAN

Gentlemen: Kindly send me (FREE OF CHARGE) completely illustrated, descriptive literature, price, guarantee information, and full details of your attractive "TRY IT ON YOUR OWN LAWN ON APPROVAL OFFER."

FREE

NAME _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____